Aalto University
School of Business

“IS ANYONE THINKING ABOUT THE BIRDS?” – CONSTRAINING AND ENABLING FACTORS OF RENEWABLE ENERGY INDUSTRY DEVELOPMENT IN RUSSIA

Master’s Thesis
Miila Leisiö
Aalto University School of Business
Management and International Business
Fall 2019

Aalto University
School of Business

Aalto University, P.O. BOX 11000, 00076 AALTO
www.aalto.fi

Abstract of master's thesis

Author Miila Leisiö

Title of thesis "Is anyone thinking about the birds?" – Enabling and constraining factors of renewable energy industry development in Russia

Degree Master of Science in Management and International Business

Degree programme Management and International Business

Thesis advisors Carl Fey, Peter Buhanist, Veli-Pekka Tynkkynen

Year of approval 2019 **Number of pages** 152 **Language** English

Abstract

The main objective of this thesis is to provide a detailed analysis of the Russian renewable energy (RE) industry and its development. More specifically, this research aims to identify the main constraining and enabling factors influencing the renewable energy development in Russia. The phenomenon studied is approached through business, political, and societal perspectives.

The theoretical framework of this research rests on the idea that the Russian energy policy environment is shaped by various actors. The main actors in the industry are business and political actors that make decisions based on their own interests. Depending on their interests, the actors make decisions considering factors from different structural dimensions: resource-geographic, institutional, financial and ecological. Each of these dimensions entail both enabling and constraining factors.

The research design is a qualitative interview-based single-case study, where the unit of analysis is the Russian renewable energy industry. For the purposes of this research, secondary and primary data were analyzed. Russian governmental energy strategies and public political speeches were examined in order to understand the political will to develop renewable energy. Furthermore, for a broader reference point, fifteen semi-structured interviews were conducted to ascertain the experience of key specialists of Russian energy industry. The findings of this study are presented through the modified version of the social structurationist model.

The research concludes that the Russian renewable energy industry is still in its infancy but it has large potential that has not yet been realized. It has a favorable renewable energy support scheme that is substantially decreasing the country risk to investors. However, the findings show that there are several structural challenges that are difficult to address. The main constraints on Russian RE development are (1) the omnipresence of the conventional energy sector; (2) the strict central governance and top-down management approach; (3) societal expectation of cheap energy and vague perception of energy value; (4) no political discussion about the alarming need to mitigate climate change nor discussion on the cause-effect relationship between conventional energy systems and climate change. Moreover, the findings reveal that international efforts to diversify energy sources are viewed as a greater national risk than climate change. Finally, the most prominent reason for the sluggish RE development in Russia is the lack of political will.

Nevertheless, the Russian renewable energy industry is continuously developing and now would be a good time for companies to enter the market in order to ensure a market presence when the renewable energy business really takes off in Russia.

Keywords Russia, renewable energy, energy business, energy strategy, energy policy

Aalto-yliopisto
Kauppakorkeakoulu

Aalto-yliopisto, P.O. BOX 11000, 00076 AALTO
www.aalto.fi

Maisterintutkinnon tutkielman tiivistelmä

Tekijä Miila Leisiö

Työn nimi "Is anyone thinking about the birds?" – Enabling and constraining factors of renewable energy industry development in Russia

Tutkinto Kauppatieteiden maisteri

Koulutusohjelma Management and International Business

Työn ohjaajat Carl Fey, Peter Buhanist, Veli-Pekka Tynkkynen

Hyväksymisvuosi 2019 **Sivumäärä** 152 **Kieli** Englanti

Tiivistelmä

Tämän pro-gradu tutkielman tavoitteena on seikkaperäinen analyysi Venäjän uusiutuvan energian markkinasta ja sen kehityksestä. Tutkimus pyrkii identifioimaan tärkeimmät uusiutuvan energian markkinaa rajoittavat ja toisaalta mahdollistavat tekijät. Tutkimuksessa on otettu huomioon liiketoiminnallinen, poliittinen ja sosiaalinen aspekti.

Tutkimuksen teoreettinen viitekehys perustuu olettamukselle, jonka mukaan Venäjän energiapolitiikka on usean toimijan muokkaama. Toimijat tekevät päätöksiä omien intressiensä perusteella ottaen huomioon tekijöitä, jotka voidaan jakaa neljään eri rakenteelliseen dimensioon: resurssi-maantieteellisdimensioon, institutionaaliseen, taloudelliseen ja ekologiseen dimensioon. Tärkeimpiä vaikuttajia Venäjän energia-alalla ovat liiketoiminnan ja politiikan toimijat.

Tutkimusstrategiana on käytetty kvalitatiivista haastattelutapaustutkimusta, jossa tutkittu tapaus on Venäjän uusiutuva markkina. Tutkimuksen tietolähteenä on analysoitu sekundaari- ja primaariaineistoa. Sekundaariaineisto koostuu Venäjän valtion energiastrategioista ja poliittisista puheista. Tämän aineiston analyysin pyrkimyksenä on ymmärtää Venäjän valtion poliittinen tahtotila kehittää uusiutuvaa energiaa. Primääriaineisto koostuu viidestätoista puolistrukturoidusta haastattelusta, joissa haastateltavina toimivat Venäjän energia-alan avainasiantuntijat, muun muassa liiketoiminnan ja politiikan saralta. Tutkimustulokset on esitetty muunnellun sosiaalisen strukturaatiomallin avulla.

Aineiston analyysi paljasti Venäjän orastavan uusiutuvan energiamarkkinan sisältävän ison potentiaalin. Esimerkiksi Venäjän uusiutuvan energian tukiohjelma vähentää huomattavasti investointien maariskiä. Huomattakoon kuitenkin aineiston paljastaneen useita rakenteellisia rajoituksia, joiden korjaaminen on haasteellista. Rajoittavimmat tekijät ovat (1) kaikkialle ulottuva perinteisen energiasektorin vaikutus; (2) tiukka keskusjohtoisuus ja ylhäältä alas suunnattu politiikka; (3) halvan energian itsestäänselvyys ja ihmisten vieraantuminen energiankäytöstä ja sen arvosta; (4) riittämätön poliittinen ilmastonmuutoskeskustelu tai keskustelu syy-seuraussuhteesta perinteisen energiasektorin ja ilmastonmuutoksen välillä. Lisäksi aineisto paljasti, että kansainvälinen pyrkimys hajaannuttaa energianlähteitä nähdään isompana kansallisena riskinä kuin ilmastonmuutos. Painavin syy Venäjän jäykälle uusiutuvan energian kehittämiselle näyttää olevan poliittisen tahdon puute.

Viimeiseksi todettakoon, että Venäjän uusiutuvan energian markkinat tarjoavat monia liiketoiminnan mahdollisuuksia. Erityisesti yrityksen näkökulmasta, Venäjän valtavat luonnonresurssit sekä tarve omaksua tietotaitoa kokeneilta tekijöiltä, tekevät Venäjästä mielenkiintoisen markkinan.

Avainsanat Venäjä, uusiutuva energia, energialiiketoiminta, energiastrategia, energiapolitiikka

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

”*More than at any other point in recent history, fundamental changes to the development model in resource-rich countries look unavoidable*.” *(International Energy Agency, 2018)*

Western Europe is enthusiastically promoting the development and implementation of renewable energy. Thus, in Western Europe, it is tempting to assume that RE energy development is equally enthusiastic everywhere. However, resource-rich countries are still lagging behind. In order to catch up with the development, resource-rich countries should establish new policies and lower barriers of renewable energy market access.

This thesis is based on the assumption that the conventional energy sector, which is based on oil, gas, and coal, is going through a transition towards cleaner energy sources, such as solar, small hydro (under 25 megawatts), and wind power. According to the International Energy Agency (IEA) (2018), the conventional energy system faces four explicit challenges: (1) the shale revolution, (2) technological change, (3) energy efficiency, and (4) climate change mitigation. The new era of clean energy poses substantial challenges to economics engaging in fossil fuel energy export.

It may appear strange that there is renewable energy development in Russia at all, since the development of renewable energy has been led by energy-importing countries, such as countries of the European Union (European Commission, 2018). In addition to climate change mitigation, rising tensions around fossil fuel and increasing oil price volatility call for a transition towards renewable energy sources in the energy-importing countries (Loorbach and Verbong, 2012; Bosman and Loorbach, 2015). Thus, the energy transition and the development of the RE industry has been assumed to increase the power of energy-

importing countries while undermining the influence of major conventional energy powers, such as Saudi Arabia and Russia (Scholten, 2018). However, RE development offers several advantages. First, renewable energy can be viewed as a way to enhance energy security, mitigate climate change, and achieve social and economic advantages, for instance, through new jobs in higher education (REN21, 2014). In addition, renewable energy expansion has also mobilized private capital in emerging economies (ibid). The decreasing comparative advantage of resource-rich countries in the sustainable energy transition should therefore not be taken for granted; resource-rich countries do have the option to become leading actors in energy transition. However, if they do not prepare for the upcoming transition, the socio-economic and geopolitical consequences for resource-endowed countries will be substantial (Scholten, 2018).

Climate change is caused by excessive greenhouse gas emissions into the atmosphere which are largely due to human activities, such as burning fossil fuels. The energy sector has a decisive role in the battle against these greenhouse gas emissions (Halsnæs and Garg, 2011; IPCC, 2014). Two thirds of global greenhouse gas (GHG) emissions stem from energy production and consumption (IEA, 2019). Hence, paradoxically those benefiting least are needed most and the engagement of energy powers in the energy transition is crucial for climate change mitigation.

With its enormous energy industry, Russia could act as a game changer and a major contributor to climate change mitigation. Russia possesses the world's largest gas reserves and ranks sixth in oil reserves (BP, 2019). Furthermore, it is a leading oil and gas exporter globally (BP, 2019). Thus, even though Russia's status as a global *superpower* is debatable, it is undeniably an *energy superpower.* The conventional energy sector plays an important role in Russia's geopolitics (Tynkkynen et al., 2017). However, an increasing international effort to change the energy system and

develop clean energy solutions is threatening Russia's power position. Indeed, the complex challenge for Russia is to ensure economic and social development, political stability and, at the same time, combat climate change.

As an energy-exporting country, Russia has few incentives to develop renewable energy solutions (Klochikhin, 2012) yet gradual changes in the renewable energy industry are nevertheless taking place (Smeets, 2017). The intriguing question is *how* and *why* Russia is developing its renewable energy sector and *what* are the factors either enabling or constraining this development. And finally, an interesting question is: *Is Russia to be called an energy superpower in a more sustainable future?*

1.1. RESEARCH OBJECTIVE AND RELEVANCE

"In my understanding, this [renewable energy] is the question of the country's [Russia's] future." (Anatoly Chubais, Rusnano, 2019)

In order to develop a successful and efficient energy market, it is first important to identify the industry's harmful policies and trade barriers. The aim of this thesis is to provide a holistic, interdisciplinary overview of the nascent renewable energy industry in Russia by examining those factors in Russian society that either enable or constrain the RE industry development from the business and energy policy perspectives.

In Western Europe, even schoolchildren are marching for a more sustainable future. Hence, it may not be obvious that not all parts of the world are as enthusiastic about the climate issues. This thesis aims to shed light on the less enthusiastic perspective by studying Russian renewable energy industry development. The research builds on my motivation to understand the policy and industry environment of the renewable energy industry from business, political, and societal perspective. The political

perspective is especially important in the Russian energy business since political and business interests are inextricably linked (Hanson and Teague, 2005; Schmidt-Felzmann, 2016).

Research on alternative energy development in the resource-rich countries is quite scarce, concentrating chiefly on energy-importing countries where, as stated, the RE industry is more advanced (see for instance, Lund, 2010; Kitzing et al., 2012; Darmani et al., 2014; Atalay et al., 2016; IEA, 2016). After Russia established its capacity-based renewable energy support scheme in 2013, scholars have been interested in examining the implications of this for RE investments and in general, for the RE development in Russia (Kozlova et al., 2015; Kozlova and Collan, 2016). However, as Kozlova and Collan (2016) note, the public legislation and strategy documents are mainly available in Russian and thus, because of the language barrier, the information available about RE policies is limited (Kozlova and Collan, 2016). Furthermore, the research field lacks a coherent, qualitative study of the Russian renewable energy policy environment. Such a study would combine the analysis of the field experience of the company representatives and an analysis of energy strategies and presidential speeches (see for instance, Lanshina et al., 2018; Gavrikova et al., 2019). This study is an attempt to fill that research gap.

Considering the background and the research gap identified, the aim of this thesis is to provide an in-depth analysis of the enabling and constraining factors of Russian renewable energy industry development. The research question is formulated in the following way:

Q: What factors enable and constrain the development of the renewable energy industry in Russia?

With certain limitations, the findings of this study can be applied in other energy-exporting countries. Furthermore, this research

has both business and policy implications. With respect to businesses, it provides a review of the Russian RE market and policy and sheds light on the future opportunities of the market. Furthermore, the analysis of the company representatives' experiences provides policy insights into the development areas of the Russian RE regulatory framework. In addition, this thesis aims to shed light on the opportunities that could be seized by developing renewable energy in Russia from a policy as well as a business perspective.

1.2. RESEARCH DESIGN

This is a qualitative interview-based single-case study. I will provide more information about the case study approach in the methods section of this thesis (Chapter 4). As the basis of my argumentation, I use primary and secondary data. The primary data consist of 15 interviews conducted with specialists. These were transcribed and thematically analyzed. The secondary data are governmental energy strategies and speeches by the Russian president.

The theoretical framework of this thesis is the social structurationist model (Aalto et al., 2012, 2014), which was designed to make sense of the Russian energy policy environment. I later present the research findings in terms of the modified social structurationist model.

1.3. DEFINITIONS

The definitions below apply to the use made of the terms for the purposes of this study.

Anthropocene

The term Anthropocene is a combination of the Greek words Anthropos (anthropo) meaning *human* and kainos (-cene) meaning *new* (Davison, 2019). Anthropocene suggests that (1) the Earth is moving from the current geological epoch, called

Holocene to the new epoch, called Anthropocene and (2) that human activity is largely responsible for this movement by becoming a global geological force. (Steffen et al., 2011).

Energy transition

Energy transition can refer to the time between the introduction of a new primary energy source and its rise to becoming a substantial share of the energy market (Sovacool, 2017). In this thesis, the working definition of energy transition is "a fundamental structural change in the energy sector of a certain country, like the increasing share of renewable energy sources and the promotion of energy efficiency combined with phasing out fossil energies" (World Energy Council, 2014, p. 3).

Node

Node is a point in a network where electrical lines intersect or branch.

Producer economy/ energy-exporting country

Large producers of oil and natural gas. The export of producing economies account for at least one-third of the country's total export of goods. Oil and gas revenues form at least one-third of the country's total fiscal revenue (IEA, 2018).

Russian regions

In this study, the working definition of region is an administrative entity. Russian Federation consists of 85 subjects, each of which has its own head, parliament, and constitutional court. In the RE literature, this term is used somewhat ambiguously and its meaning has not been explicitly defined (see for instance, Lanshina et al., 2018).

Renewable energy source (RES)

In this work by renewable energy sources, I refer to wind, solar PV, small hydro (below 25 megawatts).

Wholesale electricity market

In the wholesale electricity markets the generator offers electricity to retailers.

Retail electricity market

In the retail markets, retailers provide electricity to end-users (customers).

Resource-rich country

A country whose exports of non-renewable natural resources such as oil, minerals, and metals account for more than 25% of the value of the country's total exports (IMF, 2013).

2. BACKGROUND

In the field of anthropology, the importance *of placing social and cultural phenomena in context* has long been acknowledged (Dilley, 1999, p.1). In the research field of international business, the contextualization factor has received rather little attention, even though context-related issues are the very essence of the success of international business (Michailova, 2011). Following Michailova's (2011) definition, context is a "dynamic array of factors and processes" that influence the phenomena examined (p.130). In research, one should not distance the research object too far from its environment in order to achieve an in-depth understanding and high reliability of the study (ibid). The very essence of international business is its approach to empirical phenomena at a variety of analytical levels and through a variety of theoretical frameworks (Tung and Witteloostuijn, 2008). Especially important levels of analysis are the industry and the operating environment (Buckley and Lessard, 2005), both of which are relevant to this study. Thus, in order to contextualize the phenomena of interest, I will first briefly discuss global climate change mitigation and the consequent development of the renewable energy industry. I then move on to describe the Russian electricity market, which serves as a basis for its RE development and regulatory framework. Finally, I discuss the Russian renewable energy industry and present Russia's RE regulatory framework in more detail.

2.1. CLIMATE CHANGE

As early as in 1996, the second assessment of the Intergovernmental Panel on Climate Change (IPCC) concluded that human-induced climate change poses a threat to ecosystems and socioeconomic systems. It took several years before the threat was taken seriously but now climate change mitigation is, at least on paper, on the political agenda of most Western

European countries. Climate change mitigation is an effort to control the human impact on climate change and aims to develop less environmentally deleterious energy solutions (IPCC, 2014).

Greenhouse gases absorb solar energy, trapping the heat and keeping it close to the earth's surface rather than letting it escape to the atmosphere. Accordingly, the global temperature is rising, causing severe challenges in the living environment. Greenhouse gas emissions have long atmospheric lifetimes and they mix throughout the global atmosphere. Thus, climate change does not respect national borders but is a global challenge that requires global actions and cross-border cooperation. In addition, as the world is increasingly inter-linked through the global trade, one country's climate change mitigation policies will also influence economic growth, innovation, spread of technologies and other important social goals (IPCC, 2014).

The Paris Agreement is the main international climate mitigation action to unite nations to combat climate change. The Paris Agreement was established in 2015 by countries participating in the United Nations Framework Convention on Climate Change (UNFCCC). The central aim of the Paris Agreement is to strengthen the global response to the threat of climate change by keeping the global temperature rise well below 2°C in comparison to the pre-industrial level (UNFCCC). An additional emphasis is to provide technical assistance to the least developed countries in their climate change mitigation efforts. To date, out of 197 countries that have signed the Paris Agreement, 187 have ratified it (UNFCCC). Russia ratified the Paris Agreement in September 2019 during the United Nations (UN) Climate Change Summit in New York (UN Treaty Collection, 2019).

Increased efforts need to be made in order to provide a sustainable life for future generations (See for instance IPCC, 2018). Recent extreme weather events, among others the

wildfires in Siberia and California, demonstrate the urgency of climate mitigation. According to an assessment by the IPCC, oil and gas production needs to fall by 20% by 2030 and by 55% by 2050 in order to limit the global temperature rise to 1.5°C above its pre-industrial level (IPCC, 2018). These decreases require serious changes in modern energy structures. However, despite countries' proclaimed support for the Paris Agreement, in 2018, the carbon emissions of the energy industry increased by 1.7% and reached an historically high level of 33.1 Giga-tons (Gt) of CO2 (IEA, 2018). Increased emissions are connected to the increased energy consumption driven by the strong economy and harshening weather conditions (ibid). However, to every cloud there is a silver lining – without increased use of low-carbon energy sources, the estimated emission growth would have been 50% higher in 2018 (IEA, 2018). Below I elaborate on global renewable energy development trends.

2.2. NEW WORLD – THE RISE OF RENEWABLES

Renewable energy sources are the fastest growing source of electricity and are estimated to cover 30% of electricity demand in 2023 (IEA, 2018). This rapid integration of renewable energy into the power system is receiving an increasing amount of attention worldwide (Luderer et al., 2017). Renewable energy sources (including solar, wind, hydro, biofuel, and geothermal) currently provide more than 26% of the global electricity generation and by 2050 the estimated share of renewables in the global electricity generation is expected to reach 59-97% (IPCC, 2018).

The high cost of RE has been the main obstacle to its adoption. This has been the case especially in the resource-rich countries, where conventional energy sources are cheap. However, the rapidly falling costs of RE technology facilitate the inclusion of RES in the energy system. In 2018, costs for renewable energy

technologies fell to a record low (IRENA, 2019). Between 2010 and 2016, the prices of solar photovoltaics (PV) fell by 80% and the prices of wind turbines by 30-40% (IRENA, 2016; Frankfurt School UNEP, 2017; Ram et al., 2017). Furthermore, several big economies are aiming at net zero emissions and by 2018, 169 countries had adopted renewable energy targets at a national or state/provincial level (REN21, 2019). Moreover, governments and financial institutions want to avoid the hydrocarbon lock-in – a situation where switching to the new energy systems would be burdened by systemic structures (Ram et al., 2018). Investment in RE is becoming a norm and in 2019 the exchange of renewable energy funds rose by 32% (Sanderson, 2019).

At the beginning of the 2000s, the concentration of RE deployment and manufacturing RE technology were concentrated in Europe, the United States, and Japan. These countries were the pioneers of early renewable energy investments and policy design. They created renewable energy markets that set the stage for renewable energy market expansion. A growing emphasis on climate change mitigation has further fueled the expansion of renewable energy to other parts of the world. For instance, China has become the world leader in renewable energy development. In what follows, I will briefly discuss Russia's hydrocarbon resources and their history.

2.3. RESOURCE-RICH RUSSIA – A BLESSING AND A CURSE

"Russia grew thanks to oil; Russia fell because of oil" (Gaddy and Ickes, 2010, p.307)

Russia's land area of over 17 million square kilometers makes it undoubtedly the world's largest country. Its vast amount of land mass provides an extensive natural resource base that has powered Russia's economy for centuries. Oil and gas especially account for Russia's political status. In fact, the beginning of the

modern petroleum industry can be traced back to the 19th century Russian Empire. As early as in the 1870s, under the rule of Czar Alexander II, one of the world's first oil wells was drilled in Baku, on the territory of modern Azerbaijan (McNally, 2017). Today, Russia has the sixth largest oil reserves in the world and its crude oil production is 1.54 million tons a day, which is a new post-Soviet record (BP, 2019). Russia's income from the oil and gas sector is the second largest in the world, after Saudi Arabia (IRENA, 2017). Hence, the lucky discovery of 19th century has developed into a unique combination of resource dependence, addiction, and a specific rent management system that hinders the overall economic development of the modern Russia (Giddy and Ickes, 2010; for more information, see Figure 1).

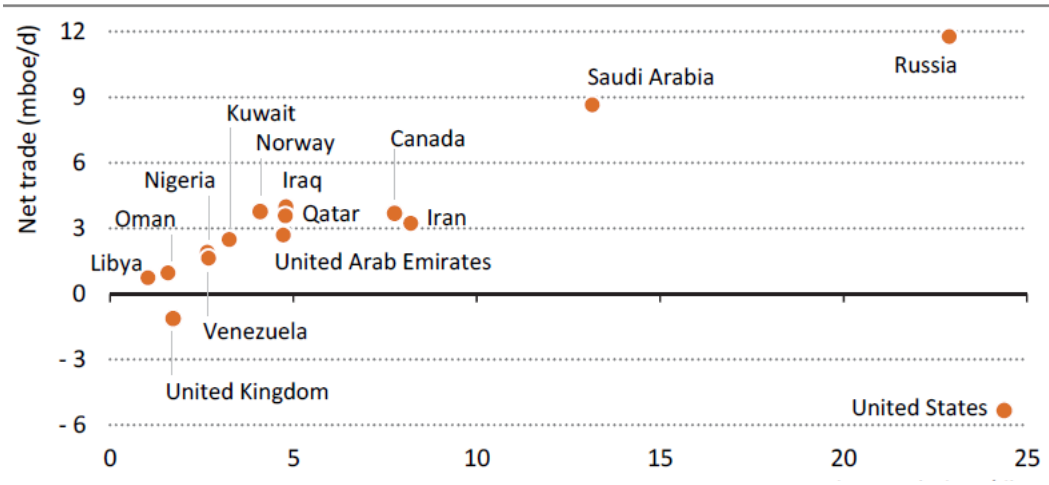


Figure 1. *Oil and gas net trade in selected countries (IEA, 2017, p.14)*

Oil is not the only resource in which Russia is rich – it also holds the leading position in other natural resource reserves such as coal, iron, bauxite, nickel, and tin (Poberezhskaya, 2015; BP, 2019). Moreover, Russia possesses the world's largest gas reserves (BP, 2019). It is the largest fossil fuel producer with a global share of 14% of combined oil and gas output (BP, 2019). Being the world's largest gas and oil exporter the economic importance of fossil fuels is substantial; approximately 40% of

fiscal revenues are generated from oil and gas export (IEA, 2018). Moreover, oil and gas revenues are estimated to account for one fourth of Russia's GDP (IRENA, 2017). Russia's natural resources can be viewed as Russia's strength but also as its weakness. Either way, the key role of oil and gas in Russia's destiny is evident. This was demonstrated, among others, in the global financial crisis in 2008.

After almost a decade of robust economic growth, it came to a halt in 2008, when the global economy was hit hard by the global financial crisis (Giddy and Ickes, 2010). The subsequent collapse of oil prices had a huge direct impact on Russia and demonstrated the crucial dependence of its economy on oil exports. Russia's highly concentrated economic structure was brought to the table by President Medvedev, who provoked discussion in his manifesto "Russia Forward":

"*The global economic crisis has shown that our affairs are far from being in the best state. Twenty years of tumultuous change has not spared our country from its* ***humiliating dependence*** *on raw materials. Our current economy still reflects the major flaw of the Soviet System: it largely ignores individual needs*." *(Medvedev, 2009)*[1]

Since the promotion of renewable energy in Russia is based on the electricity market, I will next provide a brief overview of its power structures and pricing mechanisms.

2.4. THE RUSSIAN ELECTRICITY MARKET

The Russian electricity complex is the fourth largest electricity system in the world (Boute, 2016) and is to a large extent controlled by the state. The power grid is mostly owned and operated by the state-owned transmission company, the Federal

[1] Translation by Kremlin.ru

Grid Company of the Unified Systems, which controls 95% of the country's total grid area (IRENA, 2017). The state's General Scheme determines those sites and regions where electricity generation facilities can be installed (APBE, 2019). The first General Scheme before 2020 was established in 2007. The electricity market plan is revised once in three years (ibid).

Electricity pricing in Russia is based on a *nodal pricing* model, which is also applied in the USA (Viljainen et al., 2013). Unlike in Europe, where the electricity price is calculated according to different price areas, in Russia the price is calculated separately by each node (ibid). The nodal pricing model is a rational choice in a big country with weak transmission lines (Bjørndal and Jørnsten, 2001).

Due to Russia's huge geographical size, insufficient transmission capacity and aim to keep electricity prices affordable in all regions, Russia's electricity markets are divided into different price zones (see Figure 2). The European part of Russia and the Ural region belong to the first price zone, whereas the second price zone includes the Siberian region. In the first and second price zones prices are not regulated by the government. These price zones are covered by the Russian Unified Power System, which is a wide area of synchronous electricity transmission grids. The first price zone forms 78% of the wholesale market volume and the remaining 22% is generated from the second price zone. These areas are also the most densely populated in Russia. (IRENA, 2017). In the Urals and the European part of Russia, fossil fuel and nuclear power serve as the main sources of electricity. In Siberia, half of the generating plants are run-of-river plants while the other half consists of coal and lignite-based (brown coal) generating facilities (IRENA, 2017). The Unified Power System does not reach the Russian remote areas that account for 60% of Russia's land area. These areas are inhabited by approximately 11 million people (Lombardi et al., 2016; for

more information, see Table 1). Since the electricity supply in these areas is more complex and thus expensive, the government regulates electricity prices (Interrao, 2019). Remote areas are divided into the *non-price zone* and the *isolated area,* where the electricity market functions under a monopolistic regime in order to provide a reliable electricity supply at a reasonable price (Boute, 2016). Arkhangelsk, Kalingrad, Komi Republic and regions of the Far East belong to the non-price zone (NP Market Council, 2019). Isolated areas obtain "technologically isolated energy systems" that supply energy to cities like Kamchatka, Magadan and Sakhalin Oblast (Boute, 2016, p.1031). Furthermore, remote areas consist of numerous villages, districts or industrial sites that are not connected to either the unified energy system or the technically isolated unified energy system (Boute, 2016). These areas are dependent on the Northern Delivery Program (*Severnyi Zavoz*) provided by the state (Russian Federation Council, 2018). This state program provides an annual energy supply by air or waterways. This system is extremely inefficient and expensive and the price of electricity may even reach as high as 700e/megawatt-hour (MWh).

Figure 2. *Russian electricity price zones (Abdurafikov, 2009, p.27)*

Population in one settlement	**Number of settlements**	**Total number of citizens**
Up to 50	13 500	172 600
51-500	11 100	2 400 000
501-3 000	5 700	5 900 000
3 001-10 000	580	2 600 000
Total		11 072 600

Table 1. *Population in the remote regions of decentralized energy supply, adapted from Surzhikova, 2012*

In the areas of regulated prices, the electricity price does not cover the production costs and the shortfall is made up by cross-subsidization (Boute, 2016). Hence, those who are connected to the Unified Power System pay higher electricity prices in order to enable lower prices in remote areas (Russian Constitutional Court, 2011). This practice does not incentivize companies towards efficiency in electricity generation. However, in order

for electricity prices to be affordable for citizens living in the remote areas, the compensation method is necessary.

The wholesale market functions only in the first, second and in the non-price zones (NP Market Council, 2019). In order to participate in the wholesale markets the electricity generator must comply with the requirements set by Government Resolution No 1172 "Wholesale electricity and capacity market rules" (2010) as well as with the requirements of the Wholesale Market Trading System Accession Contract (ibid).

A characteristic feature of Russia's electricity market is that it trades *two commodities*: electricity and capacity (Kozlova and Collan, 2016). In addition to electricity, the generator trades capacity, namely the amount of electricity it will produce in the future. The purpose of the wholesale market is to ensure security of supply and prevent shortages (IRENA, 2017). The capacity agreements are long-term, up to 10-year, contracts regulated by several laws (Government of the Russian Federation, 2010a, 2010b; IRENA, 2017). The agreements are called "Agreements for the Delivery of Capacity" (*Dogovor po Postavki Moschnosti*). The capacity remuneration for the business covers investment costs and an additional return and applies to the whole market regardless of the source (Boute, 2016). In the capacity delivery agreement, the capacity seller is required to maintain generating equipment in a state of readiness, generate the electricity of defined quality and in the required volume (NP Market Council, 2019). Violation of the agreement is followed by fines imposed by the NP Market Council (Kozlova and Collan, 2016).

The capacity trade arrangements differ as to whether the generating facility already exists or is only planned (Boute, 2012; Gore et al., 2012). Existing facilities go through a market-based selection process where suppliers must submit their bid in capacity auctions and the Administrator of the Trading System

selects projects with the lowest capital cost until the required annual capacity level is reached (Government of the Russian Federation, 2010; Kozlova and Collan, 2016). The System Operator (SO) determines the annual traded capacity level. New power projects (planned) that are related to the centralized investment plan are automatically entitled to long-term regulated capacity agreements. These agreements oblige them to produce a certain amount of electricity within a certain amount of time in return for monthly remunerations (Boute, 2016).

Several institutions oversee the functioning of electricity and capacity markets in Russia (for more information see Figure 3). *The Ministry of Energy* holds the supreme legislative power over the electricity markets. The *NP Market Council* is the legislative implementation body that takes part in the formulation of market rules. It is a non-profit organization that consists of various stakeholders of the Russian electricity market (Veselov and Sulamaa, 2014). *The System Operator* forms the technological infrastructure for the operation and development of the wholesale electricity and capacity markets. The *Trading System Administrator* is the market operator of the day-ahead spot electricity market (Veselova and Sulamaa, 2014). In addition, the *Federal Tariff Service* and the *Federal Antimonopoly Service* are the supervising bodies of the Russian electricity market. Below I describe the reform of the Russian electricity market that took place in 2008.

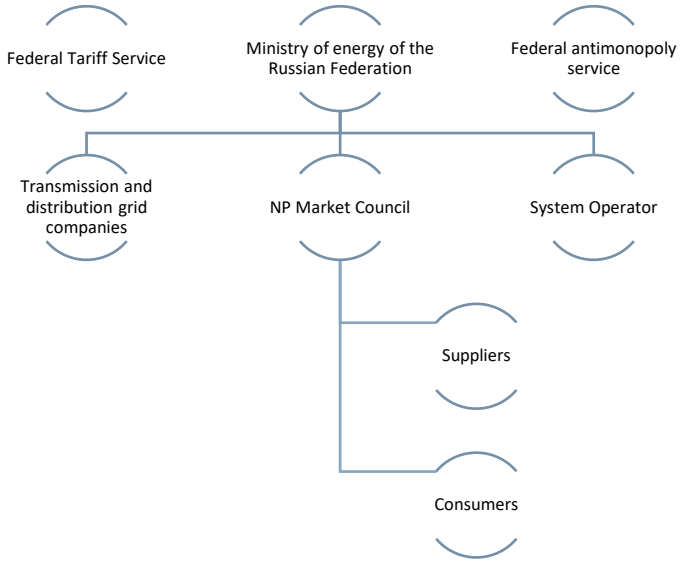


Figure 3. *Institutions of the wholesale electricity and capacity market, adapted from Veselov and Sulamaa, 2014*

2.5. ELECTRICITY MARKET REFORM

Russia's electricity market underwent a major market liberalization process led by the former Prime Minister, Anatoly Chubais and the group that evolved around him (Solanko, 2011). The price liberalization process started in 2007, when energy prices were gradually liberalized by 10-25% every six months (Kuleshov et al., 2012). In 2008, RAO UES, the Russian state-owned electric power holding monopoly that controlled the majority of the electricity transmission, was divided into 20 electricity-generating companies owned by various parties. Due to its geographical and market size the electricity market reform was one of the most complex reforms to be undertaken in the post-Soviet era (Kennedy, 2003; Engoian, 2006; Palamarchuk et al., 2008; Kuleshov et al., 2012). Even though the reform was necessary in order to achieve economic development (Solanko, 2011), because of the poor ownership diversity and an undeveloped interregional grid system, the prognosis for the success of the reform was pessimistic (Pittman, 2007).

Even after the reform, the intervention of the Russian government in the electricity market remains strong (Gore et al.,

2012). In effect, after the liberalization process, the state ownership in the electricity market has increased. After the liberalization, the willingness of generator companies to sell their assets back to the government improved and the vertical integration of gas and electricity companies has been common (Gore et al., 2012; EY, 2018). The most active operators on the electricity market are currently the state-owned companies (ibid; for more information see Table 2).

Despite these liberalization efforts, two challenges of the Soviet heritage still remain (See for instance Solanko, 2011; Gore et al., 2012). First, despite privatization and liberalization efforts, the state ownership did not decrease – quite the opposite. The market is highly concentrated and prices partly regulated (Gore et al., 2012). Second, because of the lack of investments, the outdated generating facilities as well as the old transmission lines still dominate, which creates barriers to modernization (Abdurafikov, 2009; Gore et al., 2012). In what follows, I will discuss Russia's nascent renewable energy industry.

State-owned companies	Russian private companies	Foreign companies
• Rushydro • Gazprom • Interrao • Rosenergoatom	• EvroSibEnergo • T Plus	• Fortum • Enel RUssia

Table 2. *Main electricity generators and their ownership structure in Russia, adapted from EY, 2018*

2.6. BEYOND HYDROCARBONS – RUSSIA'S RENEWABLE ENERGY INDUSTRY

"There are not many places in the world with fewer incentives to develop renewable energy [than Russia]." (Indra Overland, head of the Center for Energy Research in NUPI, Deutsche Welle, 2019)

In addition to hydrocarbon reserves, Russia has a considerable renewable energy resource base whose full potential has not yet been realized. Bioenergy and large hydropower installations (over 25 MW) are the main sources of renewable energy in Russia's energy system (see Figure 4). The remaining renewable power capacity is spread among solar PV (photovoltaic), wind, and geothermal power (IRENA, 2017). In what follows I will discuss Russia's renewable energy sources in more detail.

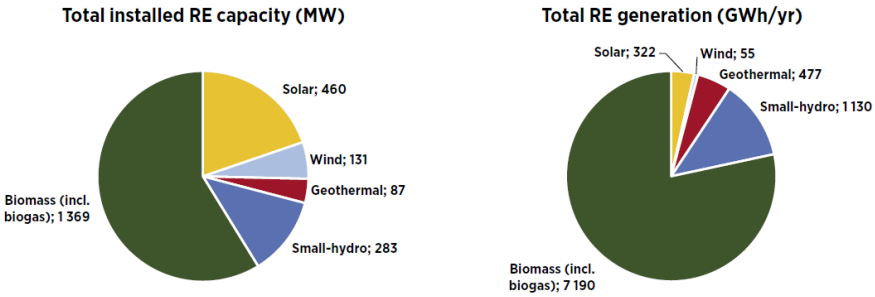


Figure 4. *Installed renewable energy capacity and generation in Russia (IRENA, 2017, p.13)*

Hydro power. Large hydropower installations have a long history in Russia dating back to the 1930s (IRENA, 2017). Russia has the greatest water resources in the world and ranks second after Brazil in the annual river run-off level (ibid). However, it still has enormous unexploited hydropower sites; only 20% of the hydro potential is utilized. The challenge is the long distance between resources (mostly in Siberia) and demand (Aalto, 2012; IHA, 2017). Russia's operational operational hydro capacity is currently 50.1 gigawatts (GW) (IRENA, 2018).

Bioenergy. Russia has considerable biomass resources from its vast forests, open woodlands, agriculture, and wood waste (Aalto, 2012). Over one fifth of the world's forests are located in Russia and it produces about 15 billion tons of biomass every year (Tynkkynen N. and Aalto, 2012; IRENA, 2017). Moreover, after launching the program of import substitution in 2014, the potential of exploiting agricultural biomass is growing

(Government of the Russian Federation, 2015b). The installed capacity of biomass in Russia is currently 1,37 GW (IRENA, 2018).

Geothermal. Geothermal capacity is concentrated mainly in the Eastern parts of Russia. The present installed capacity is 78 MW (IRENA, 2018).

Wind. Wind power is expected to be among the fastest growing renewable energy sources in Russia. Russia's 17 million square kilometers of landmass and its 38 thousand kilometer-long coastline form the world's biggest wind capacity (IRENA, 2017). The wind capacity is fairly evenly distributed across the country. In 2018 existing wind capacity was 105.9 MW (IRENA, 2018).

Solar. Russia receives a substantial amount of solar radiation, but this is not uniformly available. Regions with the best solar potential are the North Caucasus, regions bordering the Black Sea and the Caspian Sea. In addition, the southern parts of Siberia and the Russian Far East are rich in radiation (The World Energy Council, 2016). In 2018, the amount of solar energy produced was 545.7 MW (IRENA, 2018)

In addition, Russia has a substantial amount of *waste* that could be utilized as an energy source. The problem of waste in Russia is substantial and society as well as the government agree upon the urgent need to solve the problem (Kovalenko and Kovalenko, 2018, Korobova et al., 2019). The waste problem was discussed in the Presidential Annual Address in the following way:

"Perhaps the most painful topic is municipal waste. […] Yes, we have probably neglected waste disposal problems for maybe a hundred years, which means we have never paid attention to

them. […] The landfills have turned into real mountains of garbage near residential areas." (Putin, 2019a)[2]

Each year 55-60 million tons of municipal solid waste are generated in Russia, of which only 5-7% is recycled (ibid). In comparison, the European Union recycles 60% of its waste. Landfills in Russia occupy about four million hectares, which is comparable to the combined areas of Switzerland and the Netherlands (Korobova et al., 2019). Thus, the possibilities of the waste-to-energy market in Russia are substantial but unutilized. Public pressure to solve the problem has recently increased and the waste problem seems to rank high on the political agenda.

It may now appear surprising that in the 20th century Russia was one of the pioneer developers of renewable energy technology (Lanshina et al., 2018). As early as in the 1930s the Soviet Union started to produce small-scale wind turbines and in 1931 opened the world's biggest wind power plant in Crimea. Furthermore, the Soviet Union was one of the first countries to develop and use solar panels in spacecraft. It was already developing biogas power plants and in 1966 its first geothermal power plant in Kamchatka was opened. In addition, it developed biogas production from wood and agricultural waste (IRENA, 2017; Lanshina et al., 2018).

The visionary development slowed down in the 1960s. Enhanced access to the fossil fuels caused interest in renewable energy development to flag. Nevertheless, despite the abundant hydrocarbon resources the Ministry Council of the Soviet Union established a state program called "Clean Energy" and in the period 1988-1995 made a decision on the fast development of wind power technology (Sidorovich, 2015). Because of the

[2] Translation by Kremlin.ru

collapse of the Soviet Union, however, the program was never accomplished.

The RES development resumed after the financial crisis in 2008. Moreover, only in the aftermath of the economic crisis was Russia's need for foreign direct investments and for external support in research and development openly acknowledged (Malle, 2013). In this regard the renewable energy industry started to attract the attention of political and business actors. The first renewable energy target was set in 2009 with the pronouncement that by 2020 Russia will have achieved a 4.5% share of renewables in the total electricity production and consumption (Smeets, 2018). However, the target date was postponed until 2024 (Government of the Russian Federation, 2015). In what follows I will briefly present several electricity generators operating in the renewable energy sector (see Figures 5 and 6).

Enel Russia. Enel Russia is founded in 2004. It operates under the Enel Group, an Italian multinational energy company. Enel Russia has four power plants in Russia: Konakovskaya GRES, Nevinnomysskaya GRES, Sredneuralskaya GRES and Raftinskaya GRES (Enel Green Power, 2019). The total installed operational electrical capacity accounts for 9.4 GW (ibid). In addition, in June 2019 Enel achieved 71 MW of new wind capacity in an RES tender (ibid). Enel Russia has a wind turbine manufacturing contract with Siemens Gamesa (Siemens Gamesa, 2018).

Fortum. Fortum is a Finnish energy company whose Russian operations started in 2008. Fortum has 35 MW solar power capacity and in addition, 35 MW wind capacity (Fortum, 2018). Fortum is collaborating with the Russian state-owned company Rusnano in building a wind power plant in Ulyanovsk, Russia. It will be the biggest wind power plant with the total wind power capacity of 1.823 MW. The Danish manufacturer Vestas

functions as a supplier of wind turbines for Fortum in Russia (Fortum, 2017).

Solar Systems. Solar Systems was founded by the Chinese Amur Sirius Equipment CO Ltd in 2014. It operates as a manufacturer of solar panels as well as electricity generators. In 2019, Solar Systems had the total solar power capacity of 365 MW in Russia (Solar Systems, 2019).

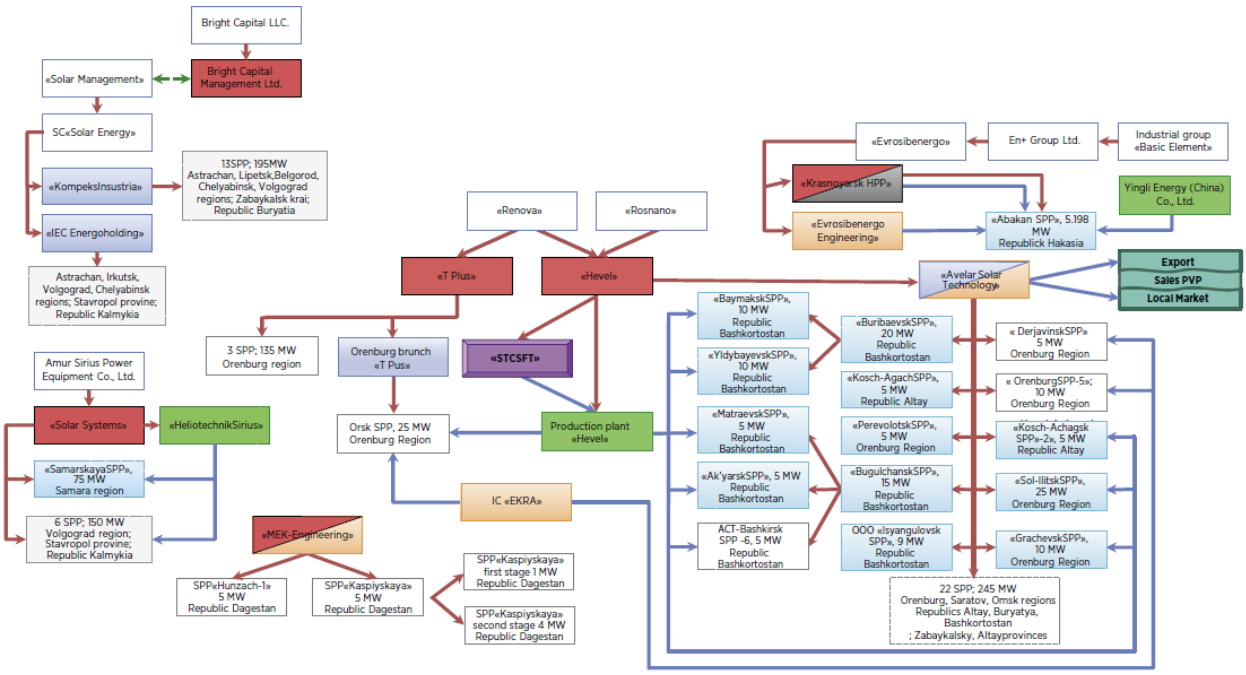


Figure 5. *Solar power companies in Russia (IRENA, 2017, p.82)*

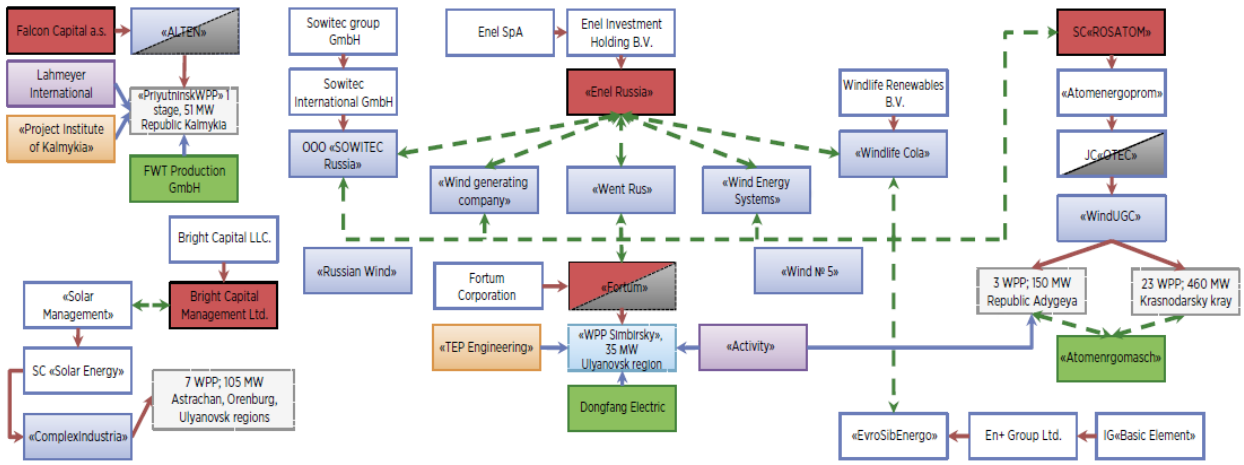


Figure 6. *Wind power companies in Russia (IRENA, 2017, p.82)*

In 2018 the renewable energy industry grew by 11% (BP, 2018). However, renewable energy sources (solar, wind, and small hydro facilities) accounted for only about 0.01% of Russian incremental consumption in 2018, putting the main emphasis on solar and wind (ibid). Even compared to other fossil fuel endowed countries like Qatar and Saudi Arabia, the share of renewables in Russia's electricity production is low (Atalay et al., 2016; Mondal et al., 2016).

In an emerging country, as Russia appears to be, the creation of new industry can be challenging. Among others, emerging countries are characterized by the lack of institutional trust and by shortages of skilled workforce with the needed expertise (IFC, 2011; see also Smeets, 2017). In addition, the Russian business environment is characterized by corruption and bureaucracy. The neopatrimonial factor, the importance of knowing the" right people", is an important element in Russian business (Ledeneva, 2009; Kivinen, 2012). In addition, it is argued that resource-rich countries often have poorly developed electricity sectors that constrain their RE industry development (Poudineh et al., 2018). Taking into account the constraining factors, it is advantageous that multiple, international stakeholders support the development of a renewable energy industry. The RES policy formation process in Russia has been supported by the European Bank for Reconstruction and Development (EBRD). The bank has invested 1,197 million euros in Russia's renewable energy industry in order to specifically support small- and medium-sized businesses (Kozlova, 2015; Zeng et al., 2017). Moreover, Russia and the EU have also collaborated in developing renewable energy in the Russian Northwest area (Boute and Willems, 2012). However, since to the events of 2014 in Crimea, diplomatic cooperation with Russia has been hampered (Aalto et al., 2017).

The modest goals of renewable energy development reflect the challenges it faces. For instance, renewable energy sources are

widely considered to be too expensive (Lanshina et al., 2018). Especially at the beginning, the RES support scheme met with resistance in Russia. In 2013, the customers and the generators of the wholesale electricity market sent a joint appeal to the Chair of the Government of the Russian Federation criticizing the renewable energy support scheme (Moreno et al., 2012). Investors' interest in the RES industry has subsequently increased; Even the companies of the conventional energy sector, like Lukoil and Severstal, have recently invested in Russia's renewable energy development (Severstal, 2018; Lukoil, 2019). In the next chapter I present the regulatory framework of the renewable energy industry.

2.7. REGULATORY FRAMEWORK OF RENEWABLE ENERGY

Successful policies can sufficiently decrease the country risk, increase investments and enhance the overall development of the field (del Río and Cérda, 2014). Globally applied renewable energy support schemes can be divided into four design types: (1) feed-in tariffs (FIT), (2) tender- or auction-based term-based tariff system, (3) renewable energy portfolio standards (RPS), and (4) quota systems (REN21, 2015). For the majority of developing countries, the "system of choice" has been the feed-in tariff system, where the electricity generator is provided with a long-term agreement with a fixed profit based on the generating technology costs (Kozlova and Collan, 2016, p.351). The least popular support in the developing countries has been for the renewable energy portfolio standard system, which allocates more risks to the investor. (Kozlova et al., 2015; REN21, 2015).

In general, emerging countries tend to adopt the kind of support scheme design that has been tested elsewhere (del Río and Cérda, 2014). Russia decided to act differently and apply the capacity-based support scheme that had not yet been used elsewhere (IFC, 2013; REN21, 2015; Lanshina et al., 2018). The capacity-based

support scheme is based on trading in capacity, whereas in most countries the support is based solely on the electricity output (Boute, 2012; IFC, 2013). Next, I will discuss the RES support scheme, the Decree No. 499, in more detail.

2.8. DECREE NO. 449

The initial attempt to develop legal basis for renewable energy development in Russia dates back to 2007, when the "Federal Electricity Law" was revised in order to establish a support mechanism for electricity generation based on the renewable energy sources. However, because of technical and legal problems, and about concern of too high consumer prices, it was never implemented (IFC, 2013). In 2011, the Federal Electricity Law was once again amended. Finally, in 2013 Decree No. 449 the *Mechanism for the Promotion of Renewable Energy on the Wholesale Electricity and Capacity Market* was introduced (Government of the Russian Federation, 2013) in collaboration with the International Finance Corporation (IFC, 2013). In 2015, the Ministry of Energy estimated that the support scheme would only add a 0.3% share of renewables by 2022 (Ministry of Energy, 2015).

Capacity delivery agreements oblige (Boute, 2011; Vasileva et al., 2015) the renewable energy generator to build a *certain type* of generating object within a *certain amount of time* and generate *certain amount of capacity* at a *certain location* (Boute, 2011; Government of the Russian Federation, 2013; Vasileva et al., 2015; Boute, 2016). In addition, the generating facilities are obliged to be in a state of constant readiness to produce electricity (Government of the Russian Federation, 2013). Central to the received support is also the localization requirement. The local content requirement demands that a certain share of the technology component is produced locally (Government of the Russian Federation, 2013). The localization percentage differs

according to the renewable energy source (ibid). If these content requirements are not met, the subsidy may be cut by over 50% (IRENA, 2017).

In order to receive payments, the electricity generator must participate in an auction process that consists of two rounds. Projects for the first round are selected by the Administrator of Trading Systems (ATS), which is responsible for selecting the renewable energy investment projects through annual tenders (IFC, 2013). In order to be selected for the first round, the participant must supply the following information: (1) project participants; (2) title of the project and generating facility; (3) facility location; (4) technology type; (5) amount of the installed capacity; (6) reference to the provisional supply points on the wholesale market calculation model; (7) estimated starting date of capacity supply; (8) capital cost estimation (in rubles per Kw installed capacity); (9) project localization level and (10) guarantees of project implementation (IFC, 2013; Government of the Russian Federation, 2013).

Projects for the second round are chosen based on the pre-determined capacity level, which is determined on an annual basis (IFC, 2013; Kozlova and Collan, 2016). If the number of projects in the second round exceeds the annual capacity reserve, the projects with the lowest capital cost levels are selected (ibid). However, if the annual required capacity is not fulfilled, the capacity that is left unused is not transferred to the following year (Smeets, 2017).

The capacity-based RE support mechanism resembles the capacity mechanism of the conventional electricity market. However, there are at least five substantial differences: First (1), the capacity price mirrors the ratio between the electricity output produced and a theoretical maximum output within a given time in order to reflect electricity production performance. Second (2),

the renewable energy market includes the local content requirement (Government of Russian Federation, 2013). Third (3), the capacity remuneration considers the fluctuating foreign currency exchange rate. The foreign share of the capital expenses is corrected against changes in the exchange rate of the ruble against the US dollar and the euro during the project investment phase (Government of Russian Federation, 2015). Fourth (4), changes in market conditions and trends in renewable energy projects are updated in the non-fixed expense share (Government of Russian Federation, 2013). Lastly (5), the renewable energy projects are not obliged to follow the system operator's dispatching orders other than to halt production at the demand of the SO (Government of Russian Federation, 2013; Kozlova and Collan, 2016). Violation of this rule will result in a 25% fine calculated from the monthly capacity price (NP Market Council, 2013).

Since the first version of the support scheme, it has been revised several times. For instance, after the depreciation of the ruble in 2015, capital expenditure (CAPEX) limits were raised and pegged to a euro-dollar basket (Government of the Russian Federation, 2015a). Moreover, content requirements were relaxed due to the lack of certain manufacturing facilities in Russia (Government of the Russian Federation, 2015b). Furthermore, in the same year the RES support scheme was extended to retail markets with the adoption of Decree No. 47 *On the Promotion of RES on Russia's Retail Markets* (Government of the Russian Federation, 2015c). This revision entailed that renewable energy generation plants below five MW were also eligible to receive subsidies.

The first RE support scheme program will end in 2024. A possible new program will be effective from 2025 onwards. So far, the continuity of the RES support program is not certain. Russian Deputy Minister of the Economic Development, Mikhail

Rasstrigin, has stated that it is time for renewable energy actors to start to operate under the same market conditions as those of conventional energy (Dyatel and Dzakuto, 2018). A pioneer actor of the Russian electricity markets and founder of the Russian support organizations for the nanotechnology development, Anatoly Chubais (2018), has noted that it is crucial to continue the support of renewable energy sources since they may not yet be fully competitive by the end of the support program in 2024. In addition, the former energy minister, Aleksandr Novak, has underlined the need to continue the support program (Dyatel, 2018).

3. REVIEW OF THE LITERATURE

As stated, the research on renewable energy development has mainly focused on the energy-importing countries (Chang and Bruyninck, 2011; Darmani et al., 2014). Thus, little is known about RE development in the energy-exporting countries. For instance, they may have different incentives or face different challenges in RE development. The renewable energy industry in Russia began to emerge less than ten years ago and it is not yet fully established (Smeets, 2017).

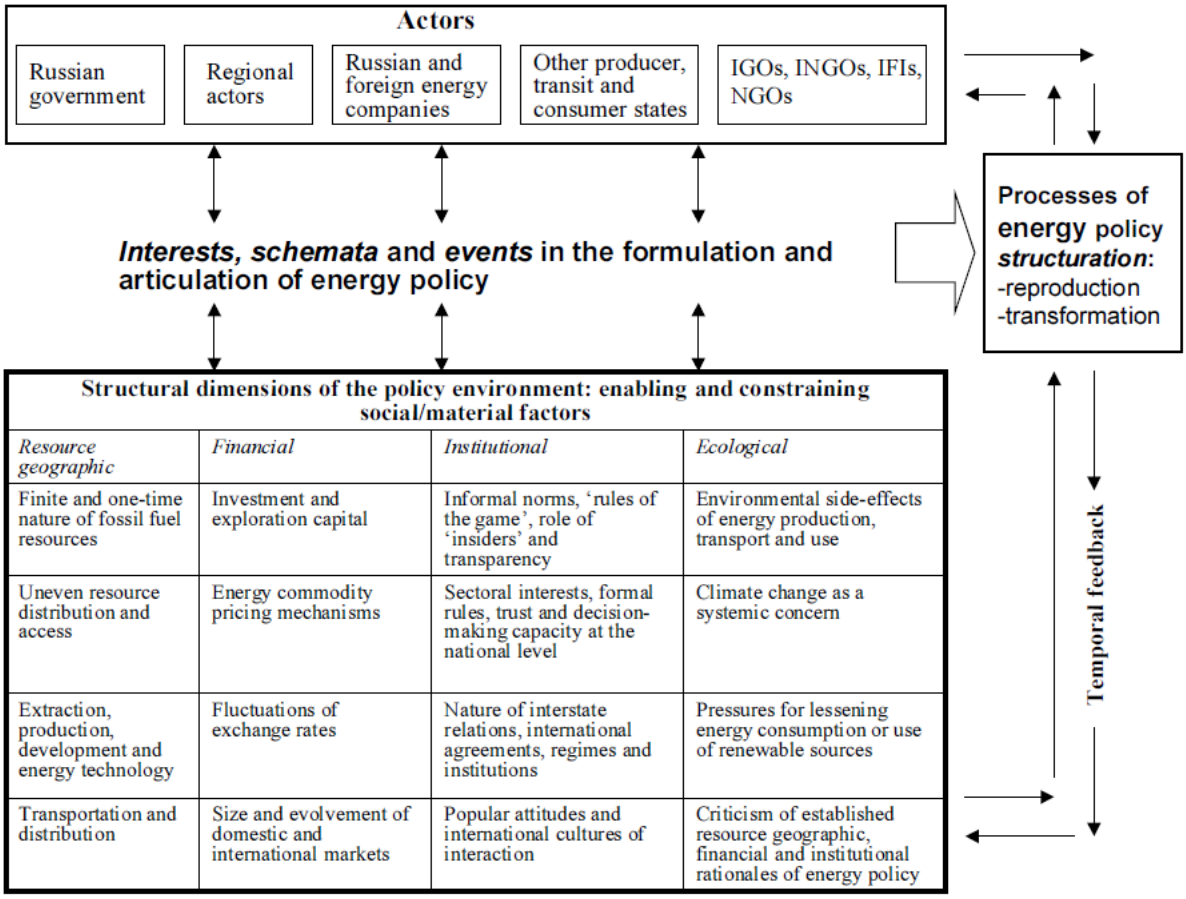
The literature on Russian renewable energy development reveals that numerous constraining factors impede RES development. These constraints are due, among others, to the enormous oil and gas lobby by the state-owned companies (Tynkkynen, 2013; Smeets 2017; see also Martus, 2019), the financial stake that political actors obtain in the energy sector (Smeets, 2014a; Skryzhevska et al., 2015), and low domestic electricity prices (Cooke, 2013; Wittmann, 2013).

The aim of this chapter is to provide an overview of the achievements so far in the existing academic renewable energy literature concerning Russia. In addition, I will discuss the theoretical framework that I have used to make sense of the findings. I will present the literature using the structure of the social structurationist model by Aalto et al. (2012, 2014), which will be presented in the next chapter. Lastly, I will present a summary of the literature discussed.

3.1. THE SOCIAL STRUCTURATIONIST MODEL

I have used the social structurationist model developed by Aalto et al. (2012, 2014) in structuring my literature review as well as findings from the empirical data. The model was explicitly designed to make sense of the Russian energy policy environment and to explain who formulates the energy policies and under what motivations. In addition, the model divides the

energy policy environment into four different dimensions and the enabling and constraining factors in each dimension. As Aalto et al. (2016) explicate, the model is generic and enables the use of many approaches to examine the Russian energy policy environment. The social structurationist model is illustrated in Figure 7.



Structural dimensions of the policy environment: enabling and constraining social/material factors

Resource geographic	*Financial*	*Institutional*	*Ecological*
Finite and one-time nature of fossil fuel resources	Investment and exploration capital	Informal norms, 'rules of the game', role of 'insiders' and transparency	Environmental side-effects of energy production, transport and use
Uneven resource distribution and access	Energy commodity pricing mechanisms	Sectoral interests, formal rules, trust and decision-making capacity at the national level	Climate change as a systemic concern
Extraction, production, development and energy technology	Fluctuations of exchange rates	Nature of interstate relations, international agreements, regimes and institutions	Pressures for lessening energy consumption or use of renewable sources
Transportation and distribution	Size and evolvement of domestic and international markets	Popular attitudes and international cultures of interaction	Criticism of established resource geographic, financial and institutional rationales of energy policy

Figure 7. *Social structurationist model (Aalto et al. 2014, p.12)*

The social structurationist model aims to make sense of the energy policy environment in Russia. Firstly, the model identifies the main energy policy actors in Russia. Since Russia is a semi-authoritarian country, the main actors are the executives and state-owned companies led by individuals who have gained political or economic power and who enjoy direct access to the top leadership (Levitsky and Way, 2010). Energy policy actors act according to their own interests, which are influenced by the occurring events and wider schemata. Schemata can be understood as a wider material and social context that influences

interests pursued within which the energy policy actors filter and arrange information. (Aalto et al., 2012, 2014).

Depending on their interests, energy policy actors act within structural dimensions that have been identified to be: (1) resource-geographic, (2) financial, (3) institutional, and (3) ecological dimension. Each dimension entails various enabling and constraining social and material factors. In the ideal situation, energy policy actors would consider all dimensions in their decision-making. However, it is common that energy policy actors consider merely one or two dimensions leaving the other dimensions with less attention. (Aalto et al., 2014).

Hence, for the purposes of this research I have chosen to use the social structurationist model since it facilitates the analysis of the Russian renewable energy policy environment within the pre-determined structures. Studying the energy policy environment from the point of view of one discipline, there is a risk of concentrating on only one dimension and bypassing explanations deriving from other dimensions. The social structurationist model takes into account all dimensions and provides a comprehensive and generic way to make sense of the energy policies. The focus of this study will be on the structural dimensions, whereas the examination of energy policy actors and their schemata will be paid less attention. Below I explain each structural dimension separately.

The resource-geographic dimension

The resource-geographic dimension addresses material features of reality. In addition, it deals with the means of production and technology used in extraction, development, and transportation. Typical actors on this dimension are energy companies, related industries, and consultancies. (Aalto et al., 2014).

The financial dimension

The financial dimension includes the incentives and constraints of the financial transactions (Aalto et al., 2014). The actors on this dimension include banks as well as big energy companies with their own financial branches. The latter is especially important in Russia, because the banking sector is rather small and the role of private finances substantial (ibid).

The institutional dimension

The institutional dimension concerns informal and formal norms as well as cultural factors (Aalto et al., 2014). In addition, factors like the regulation of production, distribution and consumption on both international and domestic levels are part of the institutional dimension. Informal norms include, for instance, the neopatrimonial element in Russia's business environment, which shows the close relationship between oligarchic business actors and Russia's executive power (Gel'man, 2015). Various culturally produced norms and customs have an extensive influence on energy policy formation (Aalto et al., 2014).

The ecological dimension

Physical and material issues are also considered on the ecological dimension, but from a perspective utterly different from the resource-geographic dimension. The ecological dimension deals with the environmental externalities generated by energy production, transportation, and use (Aalto, 2014). It is noted that actors on this dimension "play a very different game" than those of other dimensions (Aalto et al., 2014, p.34). However, as regards technological solutions and institutions the goals and interests of different players may be shared (ibid).

To conclude, in order to provide an interdisciplinary view of the Russian RE business environment and to identify the enabling and constraining social and material factors of Russian RE industry development, I will apply the social structurationist

model. Below I discuss the literature on renewable energy development in Russia.

3.2. THE RESOURCE-GEOGRAPHIC DIMENSION

The literature on the resource-geographic dimension examines the renewable energy sources and technology potential in Russia. The regional RES development in remote areas has also attracted attention (Shepovalova, 2015; Boute, 2016). I will start by reviewing the literature concentrating on RES technology and thereafter its regional development.

RES technology

Ermolenko et al. (2017) conducted an overall wind and solar PV technology assessment of Russian renewable energy potential. These authors concluded that the potential of wind and solar surpasses several times the natural gas-based power generation and that renewable energy sources could replace fossil fuels in Russian energy generation. In addition, the study emphasizes that by developing the renewable energy industry, Russia would gain significant social, environmental, and economic benefits. However, as Lanshina et al. (2018) stress in their contribution, Russia suffers from a serious lack of large-scale RES technology manufacturers.

Smeets highlighted the emphasis on developing a Russia-based RE industry (Smeets, 2018). Boute and Zikharev (2019) underlined that RES technology manufacturing and the establishment of a high-tech industry are the primary drivers of the Russian renewable energy industry.

Ermolenko et al. (2017) identified three governmental targets for renewable energy development: (1) Enhanced energy efficiency, (2) Russia's high-tech and expertise development, and (3) the reduction of Russian CO2 emissions. Salonen (2018) notes that in Russia, renewable energy is seen as a tool to alleviate, among

others, societal problems through job creation and regional development. Thus, energy strategies and their objectives can be seen to reflect various interests (Aalto, 2012).

The weak Russian technological context is also highlighted in the literature. For instance, Kozlova (2017) discussed the problem of the variable quality of electricity transfer networks between the regions. Tynkkynen N. and Aalto (2012) note that the electricity infrastructure is not sufficiently well developed for the increased use of renewable energy sources.

Regional development of renewable energy

Drawing on the previous achievements, there is a clear interest to explore the possibilities of developing renewable energy solutions in the remote areas of Russia (see for instance, Overland, 2010; Tynkkynen N. and Aalto, 2012; Gasnikova, 2013; Pristupa and Mol, 2015; Lombardi et al., 2016; Smeets, 2017). The overall view is that theoretically RES could provide technically and economically feasible solutions to energy challenges in remote areas. However, in practice, this development faces many obstacles. For instance, with respect to business, remote areas are not attractive due to their low population density (Smeets, 2018). In addition, even if certain Russian regions were interested in renewable energy development, the central government impedes regional RE development due to a lack of technical support (Boute, 2013). If regions overcame the constraints imposed by central government, they would play a decisive role in Russian RES development (ibid). Similarly, Pristupa and Mol (2015) discussed the role of regions in Russian renewable energy development. They emphasize the role of international organizations in facilitating regions in RE related activities. For instance, the authors show that the Russian Northwest region has been more active in developing sustainable energy solutions than,

for instance, the regions of the Russian Far East. This is due to the cooperation of the Northwest region with the adjacent countries. The on-going complication in diplomatic interaction impede this cooperation (Pristupa and Mol, 2015).

Lombardi et al. (2016) also contend that the implementation of renewable energy generation in isolated areas could serve as a way to enhance the socio-economic situation in Russia by decreasing the electricity prices and creating jobs. On the other hand, Boute (2016) claims that the RES market potential in remote regions is overshadowed by several economic, social, and environmental challenges. Firstly, the RES support scheme in the retail market fails to provide the investor with safe return on investment (ROI). Secondly, Boute (2016) elaborates on the unevenly dispersed renewable energy resources. He stresses that the distance between the resources and their use may be considerable and that accordingly the cost of their extraction becomes high.

To conclude, the literature on the resource-geographical dimension has contemplated the role of RE technology development in Russia and also the role of regions in the RE development.

3.3. THE INSTITUTIONAL DIMENSION

Research on Russian renewable energy development has so far focused on the RE regulatory framework, RE development, and changes in Russia's geopolitics as well as on informal institutions in relation to the renewable energy industry.

Wüstenhagen and Menichetti (2012) have stressed that the inconsistency of Russian renewable energy targets decreases the investment attractiveness of the RES industry (see also White et al., 2013). Furthermore, in their study of renewable energy development in the BRIC countries Zeng et al. (2017) identified several shortcomings in the Russian institutional environment.

The lack of financing channels, of investments in small and medium-sized businesses, and suboptimal government policies pose an additional challenge for RES development in Russia (Zeng et al., 2017). Furthermore, Proskuryakova and Ermolenko (2019) have conducted a prospective study on Russian renewable energy development. They underscored that a number of structural reforms need to be undertaken in order to seriously develop the renewable energy industry in Russia.

Capacity-based renewable energy support scheme

A Russian capacity-based renewable energy support scheme (CRESS) has attracted the attention of academics (see for instance Boute, 2016; Sharmina, 2017; Smeets, 2017; Lanshina et al., 2018). Boute (2012) conducted one of the earliest analyses of the CRESS. This author's analysis remained positive on the capability of the support schemes to create the incentives needed for renewable energy investments in Russia. However, Kozlova and Collan (2016) noted that RE market entry is a complex process. For instance, new participants of the wholesale market need to sign a Contract of Accession to the Wholesale Market Trading System. The contract includes rather strict conditions. In addition, a newcomer has to have agreements with the technology supplier groups. These agreements should be accredited by the Market Council. In addition, Kozlova (2017) underscored that the RES support mechanism is complex.

Sharmina (2017) identified two main barriers to RE industry development in Russia. Firstly, the high cost of RES electricity (in comparison to cheap gas) and secondly, path dependency, which generates a lock-in situation characterized by the legacy of inefficient buildings and machinery.

Implementation gap

As discussed, renewable energy sources account for a very small part of overall electricity generation in Russia. Thus, even though

there is a good regulatory framework, the actual number of RE projects to be implemented is small. This phenomenon has been referred to as the implementation gap (Smeets 2017; Lanshina et al., 2018). The implementation gap was discussed, among others, in the study by Pristupa and Mol (2015). These authors studied the institutional environment of renewable energy, focusing on wood pellet development, which was gaining momentum in Russia, but was eventually constrained by the passive attitude of central government. Pristupa and Mol identified the wide gap between governmental aims to support RES development and the support actually given. In addition, the authors concluded that the political emphasis on hydrocarbons does nothing to stimulate RES investors. In addition, Salonen (2018) notes that the governmental objective to develop renewable energy seems not to correspond with the projects completed.

Smeets (2017) contributed to the RES policy literature by scrutinizing the whole policy cycle of the renewable energy support scheme and tackling the implementation gap. The author found that the most constraining factors of RES industry development in Russia are, among others, the strict RE technology localization requirement and the depreciation of the ruble. If a company fails to localize the required amount of technology, the capacity price will be 55-65% lower (Vasileva et al., 2015). However, from the Russian perspective, the localization requirement is justified by the fact that it stimulates RES technology development and RES research (Vasileva et al., 2015). Localization requirements have proven to be efficient and are applied, for instance, in China, where localization has generated in the world's largest RE sector (Lanshina and Kulakov, 2017).

Moreover, Smeets (2018) notes that the RE targets are somewhat inconsistent and the formal rules can change quickly. The

inconsistency of targets is not conducive to trust and makes the business environment less attractive.

Neopatrimonialism in Russia

Scholars have studied the implications of neopatrimonialism in renewable energy industry development. Neopatrimonialism refers to a political regime where the political elite and business elite are interconnected and the division between the public and private sectors is ambiguous (Erdmann and Engel, 2006).

Smeets (2017) has stressed that the neopatrimonial factor in Russia has had an influence on the privileged position of the solar power industry (Smeets, 2017). Sharmina and Zikharev (2019) have continued that the "vested interest" of the elites may be favorable to RES industry development since big companies, even conventional energy companies, are taking an interest in renewable energy. These business elites have powerful coalitions to lobby for favorable RES policies. The authors note that certain Russian companies have exercised considerable influence on Russian RES policy formation and on the supreme position of solar PV. Thus, in this regard, the patrimonial factor can be seen as an enabling and constraining factor.

As Meulen (2009) notes, informal customs change very slowly, taking decades or even centuries. Their role in Russian business is thus still substantial. This may further hinder the institutional trust of investors. In this respect, Russian actors have a natural advantage over foreign investors since they are familiar with these norms and customs (Aalto et al., 2014).

International relations

The literature has also scrutinized the opportunities for international cooperation between Russia and Europe in terms of renewable energy. The theme has been addressed, for instance, by Øverland and Kjærnet (2016). These authors contributed to

the RES literature by discussing the prospects for combining Russian renewable energy resources and Russian achievements in basic research with Western management skills. The EU-Russian relationship in the context of decarbonization has also been included in the work of Khrushcheva and Maltby (2016). These authors underlined the chances for Europe to exert influence over Russia's attitudes towards alternative energy sources and concluded that the hydrocarbon energy dialogue between EU and Russia should continue.

The influence of renewable energy development in Russian geopolitical stances has also been acknowledged. Among others, Daniel Scholten (2018, p.1) writes, that "this transition towards renewable energy represents a game changer for interstate energy relations." Yet the influence is moderate. In their study of geopolitics of renewables in Kazakhstan and Russia Koch and Tynkkynen V.P. concluded that the geopolitics of renewables is "still a geopolitics of oil and gas", since Russian renewable energy development is only in its infancy (2019, p.15).

RES from the cultural perspective

The social acceptance of and the public discourse on renewable energy sources in Russia have also attracted attention. Tynkkynen N. and Aalto (2012) noted that a translation equivalent in Russian for the term sustainable development is hard to find. Three terms have been used in energy documents: (1) *Ecological safety* (ekologicheskja bezopasnostj); the term relates to the environmental impact of energy production, transportation, and use. Ecological safety is used in the energy strategies of Russia. (2) *Environmentally clean energy* (ekologicheski chistaia energia); the concept first appeared in the late 1980s in the Soviet Union (Bushuev and Bezrukikh, 2006, p.6). The term is used in energy strategies with respect to environmentally clean technology. (3) *Low-carbon Russia*

(nizkouglerodanya Rossiya); the term is connected to the 45:35:90 principle. Namely, to a principle according to which energy intensity should be reduced by 45%, 35% of the energy should be produced from non-fossil energy sources and GHG emissions should be kept below 90% of the 1990s level. In addition, the authors discussed that the terms *alternative energy resource* as well as *non-carbon energy resource* are used but they often refer to nuclear energy. (Tynkkynen N. and Aalto, 2012).

Salonen (2018) notes that financial aspects tend to dominate the public discussion about renewable energy in Russia. Moreover, by concentrating the public discourse on material issues, such as domestic industry development and security of supply, Russia is separating itself from the global energy transition discussion and bypassing the wider implications of renewable energy usage (ibid). Moreover, Tynkkynen V.P. and Tynkkynen N. (2018) stress that the international mainstream climate understanding is even more undermined after the ratification of the Kyoto Protocol in Russia. Russian society is more inclined to the opinion of the extreme denialists of climate change since they acquire better media visibility than those representing the mainstream climate understanding (ibid).

Furthermore, Smeets (2018) studied the Russian elite RES discourse and found that the discourse takes place on four dimensions: (1) the resource-geographic dimension, (2) the financial dimension, (3) the institutional dimension, and lastly (4) the ecological dimension. The aspect discussed varies according to the audience. For instance, for the international audience, the emphasis is given to the ecological dimension.

Even though much has been done in one decade in relation to RES development, the general insufficient understanding of renewable energy hinders market development (Smeets, 2018). Furthermore, Proskuryakova and Ermolenko (2019) underscore

the need for public pressure to develop the renewable energy industry in Russia. However, since knowledge of RES among people is poor, central government faces no pressure to act in relation to the RES industry (ibid).

To conclude, the RES literature concentrating on institutional aspects has been especially interested in analyzing the RES support scheme, the implementation gap, and the influence of RE development on Russian geopolitics.

3.4. THE FINANCIAL DIMENSION

The literature concentrating on the financial aspect has been especially interested in analyzing the financial implications of the RES support scheme in RES investment and the financial competitiveness of RES technology in Russia.

The financial implications of the RE support scheme have been discussed by Vasileva et al. (2015), who analyzed the effects of the RES support scheme on capacity and electricity prices in Russia. The authors found that the addition of RES to the final capacity price only amounts to about 1-2%. In addition, they compared the feed-in premium RE support mechanism to the Russian capacity-based mechanism. Vasileva et al. (2015) concluded that the Russian capacity-based support scheme provided better protection against external shocks.

Bratanova et al. (2016) were the first to calculate the levelized cost of energy (LCOE) for renewables in Russia. They compared the competitiveness of renewable energy technologies with the technologies of the conventional energy sector and concluded that most of the RES technologies are not competitive in Russia. However, more recently, Lanshina et al. (2018) reported more positive findings. The authors analyzed the competitiveness of wind and solar PV against conventional energy sources and showed that, even with the high weighted average cost of capital

values (WACC), solar PV and wind power could be cost-competitive in Russia.

In sum, based on the literature, it can be concluded that from the investor perspective, the support scheme provides a guaranteed return on investment and an investment shield. In addition, even in Russia, RES technology is starting to be cost-competitive with conventional energy technology.

3.5. ECOLOGICAL DIMENSION

Even though Kozlova and Collan (2016) argue that the established support scheme was initiated based on the acknowledged threat of global warming and the threat of non-renewable energy resource depletion, the earliest contributions concluded that climate issues are not the primary concern in Russia's RES policy formation (Henry and Sundstrom, 2012; Tynkkynen N. and Aalto, 2012). The authors note that renewable energy is discussed mostly within financial frames. Moreover, they noted that the Russian understanding of sustainable energy differs from the European understanding and Sharmina et al. (2013) reported that there is considerable resistance to proactive climate change mitigation and adaptation among the Russian elites.

More recently, Korppoo and Kokorin (2017) have tackled Russia's GHG emission target, which incorporates RES development. The authors found that by discussing RES development in the international context, Russia uses RES as a window dressing activity. In addition, the authors identified constraints in climate change mitigation policies. The authors argue that neopatrimonialism hinders climate change mitigation since the big state-owned companies may enjoy exemptions from climate targets. In addition, the complex policy systems originating from a lack of competent policy-makers and from the Russian bureaucratic tradition as well as from the

inconclusiveness of the legislation and its implementation are seen as a burden on renewable energy development. In sum, ecological factors are not widely considered and they do not function as a driver in renewable energy development in Russia.

Based on the foregoing, it can be concluded that the position of central government in relation to RES industry development in Russia is dominated by interrelated geographical, political, and financial factors (see also Sharmina et al., 2013). In addition, even though the Russian capacity-based support scheme has been evaluated in positive terms, the overall business environment and its informal institutions pose risks to the RES business. Table 3 provides a synthesis of the literature on renewable energy development in Russia.

Table 3. *Synthesis of the RES literature*

WORK	CONTRIBUTION	FINDINGS	DIMENSION
Boute, 2012, 2013, 2016	• An analysis of the RES support scheme (wholesale and retail market) • An analysis of the regions' role in the RES development	• RES support scheme provides incentives to invest in the wholesale markets • In retail market RES support scheme (Decree N.47) fails to provide investors with the stable tariffs • Regions could act as an important RES developers	Institutional
Boute and Zikharev, 2019	• The influence of vested interest in solar technology manufacturing industry	• The vested interest of big conventional energy companies can be beneficial for the RES industry development in Russia (Institutional)	Resource-geographic Institutional
Ermolenko et al., 2017	• Technology assessment of a variety of renewable energy sources in Russia • And present the benefits of their deployment	• Russia would benefit financially as well as socially, from deploying the RES technology	Financial
Korppoo and Kokorin, 2017	• An analysis of Russia's policies in relations to the GHG emission targets	• There are several gaps in RES regulations that hinder the development	Ecological Institutional
Lanshina et al., 2018	• An analysis of the RES regulatory framework • Studies competitiveness of wind and solar PV in comparison to conventional energy (Resource-geographic)	• Strict localization requirements constrain the RES development • Wind and solar PV may be cost-competitive in Russia	Financial Institutional
Lombardi et al., 2016	• Possibilities of RES in remote areas of Russia	• RES generation and use could benefit remote areas socially and economically by decreasing the cost of electricity	
Martus, 2019	• Russian metal and mining industry responses to the climate change	• Russian Government has no plans to phase out the coal mining industry because it has a substantial socio-economic relevance in Russia and is thus protected by the Government	Recourse-geographic Institutional
Pristupa and Mol, 2015	• An analysis of bioenergy development in Russia's Northwest	• The development has been slow, among other because of the slow policy adaptation and the lack of the central government support	Institutional Resource-Geographic
Salonen, 2018	• Analyzes the objectives of the Russian renewable energy policies through the public justification analysis	• The strategy documents emphasize the fossil fuels • The link between the energy efficiency and the use of renewable energy appears mainly on paper	Institutional
Smeets, 2017	• RES support scheme policy cycle analysis through	• The whole policy cycle of RES support entails several constraining factors explaining the implementation gap	Institutional
Tynkkynen N. and Aalto, 2012	• An analysis of the role of renewable energy in the country • An analysis of the national understanding of the environmental sustainability of energy	• The definition of the environmentally sustainable energy differs from the European understanding • The infrastructure of Russia does not support the RES energy development	Institutional
Vasileva et al., 2015	• An analysis of the CRESS on the capacity prices	• CRESS influence on the capacity price increase is only about 2%	Financial
Zeng et al., 2017	• An overall review of RES development in BRICS countries	• Russian business environment entails several institutional shortages that hinder the RES development	Institutional

4. RESEARCH DESIGN AND METHODOLOGY

In this chapter, I describe the research design along with the research methods chosen and justify their use. I begin by establishing the relevance of the study and presenting the philosophical background. This will be followed by a discussion of the research strategy and context. After providing a research context I describe the data acquisition process and the analysis method. Finally, I aim to evaluate my research and address ethical concerns where necessary.

4.1. IMPORTANCE OF THE STUDY AND PHILOSOPHICAL BACKGROUND

To recapitulate, this study aims to define the most enabling and constraining factors influencing RE development in Russia. It is important for several reasons. Personally, I have a strong interest in the Russian energy industry and especially in the business opportunities it provides. By conducting this study, I aim to learn more about the subject. This study is also important from the perspective of the Russian Federation. The global energy sector is transforming and countries, such as Saudi Arabia, China, and the United States are making substantial investments in alternative energy technology development (see for instance Diapola, 2017). This study will shed light on the current overall state of renewable energy in Russia and how RE company representatives perceive their business environment. I believe that so far there has been a lack of understanding about the Russian business environment. Old beliefs and prejudices remain fixed in people's minds. Hence, from the business perspective, I aim to increase the overall holistic understanding of the Russian operational environment. More specifically, I will tackle the Russian RE policy environment and the opportunities and threats it entails. In addition, I believe this study contributes to the academic discussion on Russia's role in the global climate change mitigation process. Moreover, there are only few studies

incorporating interviews with RE business representatives on their field experiences of their work in Russia (see also Lanshina et al., 2018). This study fills this gap by reporting on interviews conducted with the company representatives. Finally, I believe that, with certain adjustments, the findings of this study may be applied to other energy-exporting countries and their RE development.

In sum, I hope to contribute to the Russian renewable energy literature by providing two types of information. First (1), I will propose a theoretical understanding of the RE business environment by analyzing Russian governmental energy strategies. Second (2), I will provide an analysis of interviews conducted with various RE business stakeholders, among others, business practitioners, academics, and non-governmental representatives. Thus, this study provides an in-depth and interdisciplinary analysis of the most enabling and constraining factors of Russia's renewable energy development. I next discuss the philosophical background of this study.

There are three important knowledge production concepts: *ontology*, *epistemology,* and *methodology*. With the help of these concepts one unified view, a paradigm of the study can be expressed (Burrell and Morgan, 1979; Guba and Lincoln, 1994). Firstly, ontology is interested in overall existence and reality (Easterby-Smith, 2012), whereas epistemology is interested in the question of what knowledge is, where it can be acquired and if there is a limit to knowledge (Eriksson and Kovalainen, 2008).

While I do believe that without our knowledge of it, the world exists independently, I also agree with the argument that knowledge is a product of social interactions (Sayer, 1992). Following this view and considering the aims of my research, I conclude that the onto-epistemological reasoning of this research

is of a *critical realist*. Thus, I believe there is an independent reality that each person interprets differently.

Critical research has much to offer for business studies. It is a good method for providing thorough and in-depth research results. (Eriksson and Kovalainen, 2008). The position of critical realist is often connected with the epistemological reasoning called *substantialism*, which is also applied to this study (ibid). Substantialism holds that reality is material, existing irrespective of the outside viewer, but different contexts and time affect people's interpretation of material reality (Eriksson and Kovalainen, 2008). In the next chapter I move on to explain the research strategy and context.

4.2. RESEARCH STRATEGY AND CONTEXT

Based on the philosophical standpoints of my study, I conclude that it is qualitative in nature. The qualitative study method allows profound analysis of detailed data and it allows me to form a picture of the Russian renewable energy industry by examining it in its own context (Eriksson and Kovalainen, 2008: Yin, 2009). Many businesses have failed because of insufficient cultural knowledge and indifference to its importance in Russia (Fey and Shekshnia, 2011). It is thus essential to learn more about the Russian business environment and to reject the narrow-minded view of Russia. For this purpose, qualitative research is valuable and facilitates a holistic understanding.

The qualitative research tradition allows the researcher to decide upon the study design (Eriksson and Kovalainen, 2008). I have chosen to use an interview-based single-case study design (hereinafter referred to as "case study"). Following Nachmias and Nachmias (1992), a case study is a way for a researcher to collect, analyze, and interpret data. Moreover, it aims to provide a contextualized and "thick description" as well as a holistic interpretation of the specific case (Geertz, 1973; Eriksson and

Kovalainen, 2008). Thus, the purpose of the case study is to research the given case in relation to the historical, economic, technological, social, and cultural context (Shank, 2002; Eriksson and Kovalainen, 2012). According to Yin (2009, p.22), the case of the study does not need to be a company or an individual. Rather, it can be any given entity (Baxter and Jack, 2008). Miles and Huberman (1994) define case as "a phenomenon of some sort of occurring in a bounded context" (p.25). In this study, the entity examined is *the Russian renewable energy industry*. Hence, case study design allows an in-depth exploration of the case from multiple perspectives taking into consideration the complexity and uniqueness of a particular project, policy, institution, program or system (Simons, 2014).

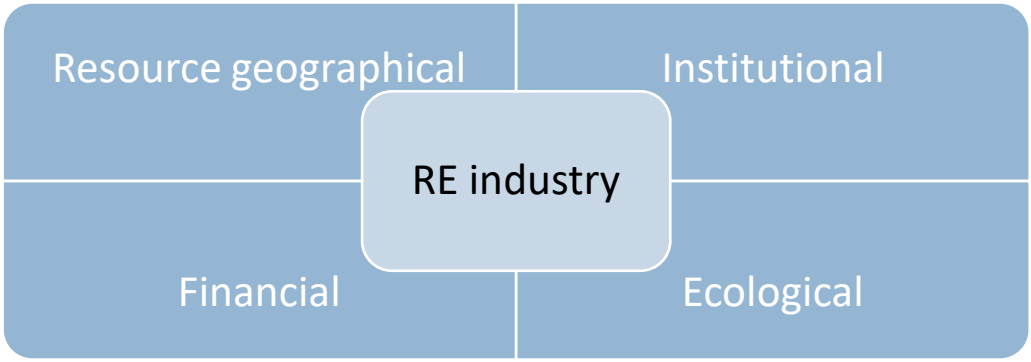
Case study designs can be classified according to various criteria. Firstly, case studies can be conducted using one or two cases (Eriksson and Kovalainen, 2008; Yin, 2009). As I concentrate on one case, namely the Russian RE industry, I will follow a single case study design. Single case study design has been criticized by scholars such as Eisenhardt (1989), who recommend the use of multiple cases in order to validate the study (see also Gerring, 2004). However, the purpose of the study should be considered (Yin, 2009). The study objective is not always to corroborate a single explanation for a problem but rather to find multiple ways of seeing the phenomenon (Piekkari et al., 2008). In this study, instead of trying to find a generalized truth, the aim is to understand why the Russian renewable energy industry is or is not developing.

Furthermore, the case study can be classified according to its scientific aims. Stoecker (1991) proposes two types of case studies according to their scientific aims: (1) intensive case study and (2) extensive case study. The aim of an intensive case study is to discover as much information as possible on one or few

cases while an extensive case study tries to identify common patterns across different cases (Stoecker, 1991). The risk inherent in an intensive case study is that of jumping too fast to general conclusions (Eriksson and Kovalainen, 2008). In order to avoid this, the research was conducted in an iterative manner maintaining constant dialogue between the literature and the empirical data (ibid).

To conclude, the case of this research is the Russian renewable energy industry. The RE industry is studied on four different dimensions: resource geographic, institutional, financial, and ecological, as illustrated in Figure 8.

Figure 8. *Researched case and its dimensions*



4.3. DATA ACQUISITION

I used two separate data collection methods. First, the secondary data was obtained from various public sources and includes governmental energy strategies and public speeches. Second, in order to obtain more information, I selected face to face, phone, and email-based interviews as a primary data collection method. I followed the suggestions of Maxwell (2008) and Huberman (1994), who take the view that data collection and analysis should take place in an iterative manner.

4.3.1. SECONDARY DATA COLLECTION

The secondary data contains qualitative information acquired from public sources. The secondary data analyzed can be divided

into two data sets according to their origin; (1) Publicly available governmental energy strategy documents and (2) Public speeches by the political and business elite.

According to Kolb (2008), secondary data should only be obtained if it relates appropriately to the problem and is relevant. The analysis of the mentioned data sets relates to the research problem in several ways. From a business perspective, understanding political intentions and formal views is essential in order to be able to do business in Russia. In addition, the implementation gap and the inconsistency of targets discussed in the literature cannot be explored without understanding the regulatory framework as well as the strategy documents. Moreover, Aalto et al. (2014), among others, take the view that the political elite is one of the most important groups of actors in energy policy formation. Since I did not manage to conduct interviews with the political actors, through the secondary data I acquired the information about what kind of strategic role is assigned to RE. In order to form a thorough and reliable understanding of the political interests in renewable energy policy formation, I analyzed two strategy documents: (draft) Energy Strategy of the Russian Federation until 2035 (Government of the Russian Federation, 2016) and Russia's Energy Security Doctrine (Government of the Russian Federation, 2019).

4.3.2. PRIMARY DATA COLLECTION

The aim of the primary data collection was to conduct in-depth interviews with market participants and other energy specialists. The aim was to elicit their perspectives and knowledge about the renewable energy industry in Russia. The interviews were conducted in Finnish and Russian. When necessary, I was able to travel to the company location and conduct interviews face to

face. All the quotes used in the study were translated into English by me unless stated otherwise.

For the purposes of my research, I conducted semi-structured interviews. Referring to Kvale and Brinkmann (2009, p.3) the semi-structured interview is "an interview with the purpose of obtaining descriptions of the life world of the interviewee in order to interpret the meaning of the described phenomena". Semi-structured format is well suited for my research as it allows me to explore new emerging themes, the ideas, perceptions, and opinions of the specialists. Semi-structured interview format allows the questions to be slightly varied according to interviewee, which is especially valuable in the case of this research since the backgrounds of the participants differ. Thus, in order to ensure in-depth answers, the questions need to be adapted to each interviewee's field of expertise. Moreover, if necessary, the semi-structured interview format allows the researcher pose additional questions and elicit clarifications (Eriksson and Kovalainen, 2008).

In Russia the use of interviews for research purposes is not well established (Voldnes, et al., 2014). In addition, because of the high power distance, it may be difficult to be granted interviewees without any personal ties and the contact will take long time to acquire (Voldnes et al., 2014). Many of the interviewees in this study were contacted through a mutual reference point, which facilitated the process. In addition, according to Welch et al. (2002), in Russia the interviewer should be prepared to gain nothing more than information that could have been obtained from annual reports or press statements. James (2015) recommends an additional e-mail exchange for clarifications. When needed, I requested additional clarifications and follow-up questions via email. However, in some cases I did not receive answers.

Sufficient preparation for the interview study is very important (Kvale and Brinkmann, 2009). Mindful of this, I prepared an interview guide, which is included in Appendix 1. The specific questions varied according to the interviewee's background but the main interview themes stayed the same throughout the research process. Participants' occupational and cultural backgrounds (Russian or Finnish) vary and this should be considered in the interview questions because the definitions of constructs vary according to culture (van der Vijver et al., 1997). Hence, without cultural modifications there is a risk of asking questions that do not make sense in a given country (Voldnes et al., 2014). Thus, when considering the questions, I wanted to leave space for country-specific modifications in order to avoid irrelevant questions. Predetermined themes were adopted from the social structurationist model by Aalto et al. (2014). The dimensions covered in the interviews were the resource-geographic dimension, the institutional dimension, the financial dimension, and the ecological dimension.

Because the specialists interviewed came from various backgrounds, the focus of the interviews was different depending on each interviewee´s field of expertise. The focus of the first theme was on gaining an overview of the business opportunities of renewable energy markets in Russia. The second theme involved the technological context of renewable energy. Third, the concentration was on renewable energy politics and followed by a question about the regulatory framework of the renewable energy sector and how it reflects the needs of investors. The final question for all participants concerned their expectations regarding the future development of the renewable energy industry in Russia.

Throughout the interview process the themes stayed the same. However, as I gained insightful information I added a question about the information acquired in the next interview in the

interests of validity. This was the case, for instance, with the waste-to-energy industry.

4.3.3. SELECTION OF PARTICIPANTS

I conducted a key informant interviews with stakeholders of the Russian energy field. The interviews were conducted from March to July 2019. The group of stakeholders included, among others, RE company representatives, academics, and a specialist on environmental non-governmental organizations (NGOs). Since this study was conducted in Finland, the company representatives interviewed were all from the Finland-based multinational energy company Fortum that has substantial stakes in the Russian RE industry. Despite of the made effort I did not have a participant from the Russian renewable energy company. The purpose of the key informant interview is to collect information from a range of people with first-hand knowledge about the chosen community (Foster and Robson, 1989). Key informants know what is going on in the chosen community (ibid), which in this study refers to the Russian (renewable) energy field. In this study, six specialists were interviewed face to face, five specialists were interviewed by phone, one by skype, and, in addition, two interviews were conducted by email. James (2015) argues that email interviews can result in thoughtful and reflective answers since interviewees are able to take time to reflect on their answers. This is not possible in face-to-face or phone interviews. However, email interviews entail more risks of misunderstandings and misinterpretations. Moreover, in answering by email an interviewee may be inclined to give short responses (ibid).

In addition to the interviews, one primary data set was obtained in a meeting between two of the representatives of OAO Fortum and the Russian Association “NP Market Council” that organizes trading on wholesale and retail and capacity markets. I was not

allowed to record the meeting but I took careful notes. Furthermore, I was able to ask follow-up questions from the OAO Fortum participants. In this meeting, my role was to act as an observer. I used unobtrusive and non-disguised observation methods (Gubrium and Holstein, 2001; DeWalt and DeWalt, 2002; Eriksson and Kovalainen, 2016). Hence, during the meeting I did not interrupt the negotiation process with any additional questions but the participants new that I was observing the meeting and taking notes. The meeting was initiated by Fortum representatives and it was arranged to discuss the further development of the renewable energy capacity support scheme.

To conclude, I had 14 interviewees and one primary data set obtained via an observation method. Each participant was chosen because of their extensive knowledge and experience on one or more structural dimensions of the Russian energy policy environment. The interviews lasted from 30 to 90 minutes and resulted in 100 pages of transcribed data. Two of the participants did not want to be directly referred to.

It is also important to consider who the interviewees are in order to be able to analyze the data with a better understanding. Interviews conducted with non-elites are perceived differently from elite interviews. Elites can be defined as a socially superior group benefiting from a greater amount of power, talent and privileges than other members of a society (Hornby et al., 1983). The interviewees of this research mostly consisted of elites accustomed to communicating with various groups of people and it may be that they dominate the interview (Ostrander, 1993; Fitz and Halpin, 1995). In addition, the interview situation entails a certain power asymmetry (Welch et al., 2002) since I am a student and the interviewees are older specialists in high-level positions.

4.4. DATA ANALYSIS

There are multiple ways to carry out data management and analysis. Gibson and Brown (2009) emphasize the importance of data analysis stating: “The “success” of a research project is very much contingent on the analysis of data” (p.1). Taking this into consideration, in this chapter I carefully illustrate the data analysis process.

In the phase of analyzing the data, I used coding as a tool to organize my findings for further analysis. Coding is a heuristic method of discovery for finding a meaning in the data (Saldana, 2011). Usually the code is one word or a short phrase that captures the essence of some portion of data.

The thematic analysis method is most relevant to this study. According to Braun and Clarke (2006) thematic analysis is “accessible and flexible” (p.2) and especially recommended for use in the case of an inexperienced researcher, as I appear to be. Thematic analysis helps to find answers to questions that only become apparent after the data analysis. Furthermore, it helps the researcher to focus on the data in numerous different ways (Braun and Clarke, 2006). Inductive thematic analysis method is a bottom-up method where codes, themes, and categories are derived from the data in such a way that the analysis is close to the data content (ibid). The deductive approach is constructed as a top-down method and the analysis is done on the basis of predetermined themes and categories. In reality, it is nearly impossible to conduct a purely inductive analysis as the researcher always brings something to the analyzed data (ibid). According to Stake (1995) “Good research is not so much about good methods as much as it is about good thinking.” (p.19). Even though I mostly used the deductive approach, when relevant, I also let new themes arise.

In the first analysis phase, I transcribed the interviews and read and re-read the transcriptions. Transcription is done in a way that

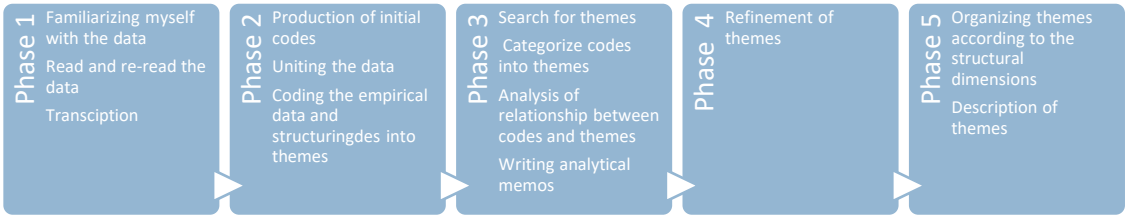


Figure 9. *Data analysis process, adapted from Braun and Clarke, 2006*

is true to the original nature of the interviews but which also suits the purposes of my study (Edwards, 1993). In the second phase, as I familiarized myself with the data, I identified as many code words as possible. In the third phase, I connected the code words in order to develop themes. First, I came up with 25 themes. In order to make the findings more structured and condensed, I started to reread the themes and reflect on their interconnections and whether some of them could be combined. The fourth phase consisted of refining my themes. In addition, I used the analytical memo as a tool as recommended by Saldana (2011). The analytical memo or "think piece" is reflexive freewriting for observing interpretations of data. A memo is recommended to be written after the codes have been clustered in order to expand the reflection (Saldana, 2011). Lastly, I organized the themes according to the structural dimensions they belong to (Braun and Clarke, 2006). The data analysis process is visualized in Figure 9.

In the data triangulation method, data from various sources are combined and compared with one another (Hammersley, 1996; Silverman, 2001). In this study, the secondary and primary data sources were combined (Eriksson and Kovalainen, 2008). Triangulation is also a valuable method because it makes it possible to find new angles and ideas on the topic researched (Eriksson and Kovalainen, 2008). However, triangulation may also make the analysis of the data more complicated and generate contradictory results (Marschan-Piekkari and Welch, 2004).

The analysis of the primary data is conducted on a semantic level by looking mainly at the "surface" and not trying to find meanings "behind" the words (Braun and Clarke, 2006). However, instead of merely providing a description of the data, my aim is to interpret it and connect it with its broader meaning.

There are two basic models of research. In a deductive research model, theory is the first source of knowledge. In induction, the theory is an outcome of the empirical research. Braun and Clarke (2006) note that even though one or another usually predominates, inductive and deductive methods cannot completely be separated in research. Many researchers use induction and deduction in different phases of their studies, which means that they move iteratively between these two during the research process (Eriksson and Kovalainen, 2008). In this work I used both theory and empirical data to guide my data analysis.

4.5. VALIDITY AND RELIABILITY OF THE STUDY

In this section I discuss the evaluation criteria of the research. In order to evaluate the successfulness of the study, the goals and purpose should be restated and the findings of the study should be evaluated in relation to the research questions (Eriksson and Kovalainen, 2008). Thus, to recapitulate, this study seeks to answer the question *"What factors enable and constrain the development of the renewable energy industry in Russia?"*

A successful study is both reliable and valid. *Reliability* is a commonly used evaluation criterion (Eriksson and Kovalainen, 2008). It shows to what extent the study can be compared to others and how consistent it is (ibid). *Validity* refers to the truthfulness and accuracy of the findings (Altheide and Johnson 1994, p.486). Research should be constantly evaluated throughout the research process and the evaluation criteria should

be consistent with the methodology, aims, and assumptions of the study (Eriksson and Kovalainen, 2008; Yin, 2009).

Articulation of data analysis decisions and a rich description of the study are essential for reliability and validity (Whittermore et al., 2001). Thus, following the recommendation of Yin (2009, p.22), I explain each step of the research process in detail. Moreover, a case study database is required in order to ensure research reliability (Yin, 2003). Each interview was transcribed. Moreover, secondary data analysis resulted in documents with remarks and analysis. The analysis process resulted in a wide database that further validates the research findings. Furthermore, a reliable study conducted by another researcher and with the same tools and data should yield the same outcome (Eriksson and Kovalainen, 2008). All relevant documents for another researcher to conduct the study are attached in the appendices.

As stated in section 4.4, I used triangulation by collecting primary as well as secondary data from various sources (Eriksson and Kovalainen, 2008). Rich data acquired from various sources strengthens the reliability of the study (Hirsjärvi et al., 2000; Patton, 2002; Hurmerinta-Peltomäki and Nummela, 2006).

5. FINDINGS – SECONDARY DATA

To recapitulate, I had two types of data: secondary data and primary data. The secondary data consists of the (draft) Energy Strategy of the Russian Federation until 2035 (Government of the Russian Federation, 2016) and the Energy Security Doctrine of the Russian Federation (Government of the Russian Federation, 2019). In addition, I analyzed two presidential speeches. First, the Presidential Annual Address to the Federal Assembly (2019) and the presidential speech held in the Global Manufacturing and Industrialization Summit (2019). The primary data consists of 15 interviews with energy specialists from various backgrounds.

I now discuss the findings from the secondary data: first my findings from the (draft) Energy Strategy of the Russian Federation until 2035 and the Energy Security Doctrine of the Russian Federation. The analysis process entailed reading through the document, re-reading it, making notes and codes, and identifying the main emerging themes.

5.1. ENERGY STRATEGY OF THE RUSSIAN FEDERATION UNTIL 2035

"*Russia was and remains one of the leaders of the global energy system*" *(Government of the Russian Federation, 2016, p.5)*

The aim of this chapter is to present the findings from the analysis of the (draft) Energy Strategy of the Russian Federation until 2035 (Government of the Russian Federation, 2016) from the perspective of RE industry development. For the sake of clarity, I have divided the chapter into three parts. I start by describing the challenges referred to in the Russian energy industry. I then proceed with the strategic targets and mechanisms of realization. Lastly, I recapitulate the findings. At the end of each part, I have summarized the main strategic objectives according to the energy policy dimension they cover. In addition, I have noted whether the strategic objectives enable (E) or constrain (C) RE industry

development in Russia. Further, all references are from the (draft) Energy Strategy of the Russian Federation until 2035 (Government of the Russian Federation, 2016).

The (draft) Energy Strategy of the Russian Federation until 2035 consists of six main chapters (hereinafter referred to as "the Energy Strategy"): (1) The current state and future challenges of the Russian and global energy markets; (2) Targets, priorities, and realization; (3) Directions and development targets of the energy sector; (4) Directions and development targets of government control over the energy sector; (5) Mechanisms of realization and (6) Anticipated results. The draft is 78 pages long and it is only available in Russian.

Challenges

Challenges identified in the Energy Strategy were divided into internal and external. Russian internal challenges influencing the energy industry were identified in the Energy Strategy as follows: (1) Increasingly depleted fossil fuel resources; (2) Poor infrastructure; (3) Backwardness of Russian energy technology; (4) Vulnerability of Russia's economy to external shocks; (5) Limited opportunities to attract long-term financing and (6) low economic growth in the country (Government of the Russian Federation, 2016, p.5).

External challenges mostly concerned the changing energy market structure and climate change mitigation efforts undertaken by other countries:

"[Most important changes in the energy markets entail] an active development of most countries to diversify their energy resource structure, among others, through increased use of renewable energy sources and local fuels as well as the diversification of the hydrocarbon suppliers." (Government of the Russian Federation, 2016, p.6)

More specifically, the external challenges of the Russian energy markets identified were outlined as follows: (1) An enhanced global trend of diversification of energy sources, among others, the use of non-hydrocarbons; (2) Changes in the global regulatory framework concerning energy markets (i.e., the increased role of consumers in the energy market); (3) Increased global energy efficiency and (4) Growing competition in the renewable energy industry. (Government of the Russian Federation, 2016, pp.5-6). The diversification of energy sources is discussed in the following way;

"[…] [European countries] will make every effort to diversify their sources of energy supply and to increase the share of renewable energy in the energy mix." (Government of the Russian Federation, p.6)

Diversification efforts and the aim to increase the share of clean energy sources are thus viewed as external challenges. Moreover, there is no discussion about the connection between the development of clean energy solutions and climate change but rather climate change is seen as an excuse to develop alternative energy solutions abroad.

Renewable energy was discussed in the Energy Strategy rather briefly. It was noted that the development of solar industry has accelerated, whereas the manufacturing of wind turbines is lagging behind (Government of the Russian Federation, 2016, p.38). In addition, the use of local energy sources, such as wood waste, is acknowledged to be "unjustifiably" low (ibid, p.38). The main challenge of RE is its low price compatibility in comparison to the conventional energy sources:

"The main problem of renewable energy sources is their poor competitiveness in comparison to the central electricity system." (Government of the Russian Federation, p.38)

To conclude, the Energy Strategy reveals that the changes in the global markets are acknowledged but the fully-fledged transition is anticipated in the far future. Hence, according to the Energy Strategy, Russia does not anticipate any notable changes in its oil or gas exports (Government of the Russian Federation, 2016, p.7) nor is it planning to make them. For instance, Russia is further aiming to develop its coal production and exports.

Table 4 presents the main challenges described in the Energy Strategy. They are divided according to the structural dimensions. At the end of each factor I have noted whether the factor is enabling (E) or constraining (C). Several challenges can be viewed as both enabling and constraining the RES industry development in Russia.

Table 4. *Strategic energy challenges considered through structural dimensions, E=RES enabling, C=RES constraining*

Resource-geographic • Poor energy infrastructure (C) • Backwardness of Russian energy technology (C) • Global diversification of energy sources (E) • Exhaustion of fossil fuels in Russia (E)	**Institutional** • Changes in the global regulations in the energy markets (e.g., environmental) (E) • Future decrease in the energy trade to Europe (C)
Financial • Limited opportunities to attract long-term financing (C) • Vulnerability of Russian economy to global shocks (C) • Increased investments in R&D (E)	**Ecological** • Influence of climate change on the infrastructure (C&E)

Targets

"The purpose of the [Energy] Strategy is the structural and qualitative transformation of the country's energy sector by contributing maximally to its dynamic socio-economic development." (Government of the Russian Federation, p.13)

By 2035, Russia aims to: (1) Achieve compatibility in energy technology; (2) Maintain its leading political and economic position in the energy industry; (3) Enhance energy efficiency in the country; (4) Develop more sustainable energy solutions; (5) Diversify energy-exports, and (6) achieve a sufficient level of

renewable energy investments (p.14). However, the sufficient level of investments is not specified.

In addition, the Energy Strategy aims at the following: (1) To enhance competition in Russian energy markets; (2) To decrease the negative impact of the depletion, generation, transportation and use of energy on the environment, climate, and people's health; (3) To develop a long-term, transparent tariff regulation; (4) To improve technology cooperation with the BRIC countries (Brazil, Russia, India and China) and the OPEC (Organization of the Petroleum Exporting Countries); (5) To develop the energy infrastructure in remote areas of the Russian Far East, East Siberia, the Russian Arctic, Crimea and Kalingrad; (6) To improve the efficiency of the state-owned energy corporations and (7) to Improve the state control over the energy markets. (Government of the Russian Federation, 2016, p.16).

According to the Energy Strategy, Russia anticipates a "technological revolution" (p.50) as energy technology development accelerates. However, the overall focus on the conventional energy sector was prevalent in the Energy Strategy. The strategic objectives include conventional energy technology development and modernization. Moreover, the Energy Strategy revealed the decisive relevance of the conventional energy sector to Russia's socio-economic development, as seen in the quote below:

"Energy projects act as "growth points" […] for the implementation of the socio-economic development strategies of the Far East, Eastern Siberia, the Russian Arctic zone, the Crimean Peninsula and Kaliningrad region."(Government of the Russian Federation, 2016, p 4)

RE was seen to be most valuable in remote areas:

"Promising areas for renewable energy development are isolated areas, as well as […] RES electricity generation for

especially responsible consumers." (Government of the Russian Federation, p.39)

The Energy Strategy sets two targets for RES development. First (1), implementation of new renewable energy solutions in the energy system, albeit contingent upon *their cost-effectiveness* (Government of the Russian Federation, 2016, p.39). Second (2), the aim is to develop a national science and technology base and increase manufacturing of RES technology in Russia (ibid).

The main targets of the Energy Strategy are summarized according to the structural dimensions in Table 5. In addition, I have noted whether the target pursued enables (E) or constrains (C) the development of the RE industry in Russia. Several factors can be viewed as both enabling and constraining.

Table 5. *Strategic energy targets considered thought structural dimensions, E=RES enabling, C=RES constraining*

Resource-geographic • International level of competence in the energy technology manufacturing (C&E) • Increase the import substitution in energy technology (C&E) • Increase energy efficiency (E) • Develop energy in regions → develop regions (E) • Develop the science and technology base of RES technology in Russia (E)	**Institutional** • Maintain the power position in the global energy markets (C) • Diversify energy exports (C) • Enhance the international relations (with BRICS and OPEC) (C) • Develop the socio-economic situation as well as human capital (E) • Increase the state control over energy markets vs. market liberalization (E&C)
Financial • Increased investments in R&D (E) • Obtain sufficient level of RE investments (E&C) • RES development in within the financial frames (C)	**Ecological** • Improve the environmental protection and decrease the negative impact of energy industry on environment, climate and health €

Mechanisms of realization

"The most important result of the strategy will be the transformation of the country's energy sector to a higher, qualitatively new level, which will contribute as much as possible to the dynamic socio-economic development of the Russian Federation and ensure the effective use of natural

resources." (Government of the Russian Federation, 2016, p.66)

The Energy Strategy presents six realization mechanisms: (1) Internal energy market regulation which entails, among others, improvement of the anti-monopoly policy and wholesale and retail market regulations; (2) Cost and tariff regulation, encountering the use of stock exchange prices as an indicator in order to develop the competition and increase the transparency of the internal markets; (3) Tax system improvements, entailing the "rational" distribution of revenues between state and business generated by the energy complex as well as attracting investments in the hard-to-recover oil reserves (p.63); (4) Governmental programs with special concentration on the national security factors and the socio-economic development; (5) Enhancement of the state's corporate governance and (6) mechanisms for improving the development institutes that would foster the public-private partnership, innovation and investments. (pp.62-64).

In addition, the measures needed to develop renewable energy in Russia are discussed. Among others, the measures note the enhanced government control system to monitor the fulfillment of requirements by RE companies; enhanced standardization and control of RES technology; technology transfer and localization to Russia; intensified international cooperation in the sphere of RE technology and knowledge. (Government of the Russian Federation, 2016, p.39).

Table 6 summarizes the main realization mechanisms mentioned in the Energy Strategy. Each measure is placed on the dimension it covers. In addition, I have noted

whether the measure enables (E) or constrains (C) the development of the energy industry in Russia.

Table 6. *Mechanisms of realization of targets considered through structural dimensions, E=RES enabling, C=RES constraining*

Resource-geographic	**Institutional** • Market regulation (E) • State-corporate governance (E&Cs) • Development institutes and public-private relations (E)
Financial • Cost and tariff regulation (E) • Tax regulation (C)	**Ecological**

To summarize, the conventional energy sector is prioritized in the Energy Strategy. It clearly has a decisive role in Russian national security. The document did not provide any new openings for energy "business as usual" in Russia. In what follows, I have identified the four most important points of the Energy Strategy.

First, the document was somewhat inconsistent. For instance, market liberalization was discussed in a twofold manner: On the one hand the emphasis is *on the further liberalization of energy markets* (Government of the Russian Federation, 2016, p.13), on the other, it is said that [the priority is] *to improve government control in the energy sector* (ibid, p.16). It is obvious that there is an aim to develop but, at the same time, to maintain the status quo and to protect those who benefit from the current system. The same inconsistency in relation to market liberalization could also be observed in the President's annual address:

"Naturally, everyone wants to be and should be competitive, but wherever possible, you need to rely on our producers, on domestic ones. […] Of course, there must be a competitive environment, but we already have the tools to support Russian

manufacturers. We must not forget about these tools, and use them." (Putin, 2019a)[3]

Second, very strong emphasis is put on energy technology development and in the technology import substitution. This is an indication that the localization requirement of the renewable energy support scheme will be further intensified.

Third, climate change is not perceived as a major threat and hence renewable energy is not a solution to the global challenge. Climate change was discussed very briefly in relation to economic development, in the following manner:

"[General changes in the global economic development encounter] increased negative impact of climate change on functioning life-supporting infrastructure and as a result, tightening policies on issues related to climate change and its results." (Government of the Russian Federation, 2016, p.77)

Fourth, while renewable energy was seen as a solution to improving the inefficient energy supply and socio-economic situation in the remote areas, the solution to the environmental harm caused was further development of conventional energy products and technology. The same idea can be observed in the speech by President Vladimir Putin at the Global Manufacturing and Industrialization Summit:

"However, the hopes that new technology as such will save the world from the growing anthropogenic influence largely proved to be an illusion. […] Absolutist, blind faith in simple, showy but not effective solutions can lead to problems. I mean such approaches as the total rejection of nuclear or hydrocarbon

[3] Translation by Kremlin.ru

energy, for example, going wholeheartedly for existing alternative energy sources alone." (Putin, 2019b) [4]

To conclude, according to the findings, the Energy Strategy is designed mindful of the resource-geographic, institutional, and financial factors. Ecological factors are very little considered. Table 7 highlights the most enabling and constraining factors on each dimension affecting the RES industry. Several factors can be viewed as both enabling and constraining. In the next chapter, I will present findings from the Energy Security Doctrine.

Table 7. *Enabling and constraining factors considered through the social structurationist model. E: RES enabling C: RES constraining*

Resource-geographic • Strong emphasis on technology localization (E&C) • Acknowledged need to improve the electricity infrastructure (E) • Desire to improve the improve the energy systems in remote areas, among others, with the help of RES (E&C)	**Institutional** • Controlled market (C) • Contradictory strategy objectives (C) • Strong political emphasis on the conventional energy sector (C)
Financial • Strong emphasis on economic benefit (C) • Acknowledged need to acquire investments (E)	**Ecological** • Minor relevance of ecological factors (C)

5.2. ENERGY SECURITY DOCTRINE

For a more profound and up-to-date understanding of the governmental aims and trends in relation to the energy markets, I also analyzed the Energy Security Doctrine of the Russian Federation (Government of the Russian Federation, 2019), which was approved by President Vladimir Putin in May 2019. As mentioned in the preceding chapter, national security and energy issues are interlinked. In addition, the Energy Security Doctrine

[4] Translation by Kremlin.ru

of the Russian Federation (hereinafter referred to as "the Energy Security Doctrine") showcases how Russia perceives its political position in the transforming energy markets. Since the analysis showed that the findings from the Energy Security Doctrine are largely aligned with the Energy Strategy, I will present the findings rather briefly, underlining several important points.

Firstly, the importance of the Russian energy industry in preserving both national and international security was underlined:

"The energy complex of the Russian Federation […] contributes substantially to national security and the socio-economic development of the country." (Government of the Russian Federation, 2019, p.2)

"[…] [Russia] plays a significant role in global energy security […]" (Government of the Russian Federation, 2019, p.3)

Aligned with the Energy Strategy, the changing structure of energy demand was perceived as an external threat. The negative effects of international climate mitigation policies and energy diversification efforts were strongly underlined:

"*The external challenge to energy security is an increased international effort to pursue climate mitigation policies and the transition towards a "green economy."(Government of the Russian Federation, 2019, p.4)*

In addition, the document underscores that the political will of Russia for international cooperation goes only as far as it does not run contrary to its national interests. This was discussed in the following manner:

"*[…]Russian Federation is supporting international efforts to mitigate climate change and is ready to cooperate in this regard with all governments […] [Russian Federation] is participating in the international climate change discussion to an extent that is*

consonant with its national interests. […] [Russian Federation] does not engage in the biased climate change discussion that undermines the interests of energy producing countries […]" (Government of the Russian Federation, 2019, p.4)

Similarly the prior findings, the Energy Security Doctrine reveals that the climate change is viewed to be an excuse for disturbing Russia's energy business:

"*[External economic and political threats are] the discrimination of Russian energy companies in global energy markets through the changes in the international legislative system, among others, under the pretext of climate mitigation and environmental politics or energy import diversification strategies." (Government of the Russian Federation, 2019, pp.4-5)*

Accordingly, in the global markets, energy companies are regarded to be threatened by the "excessive environmental constraints" (p.7). At the same time, however, there is a suggestion in the Energy Security Doctrine about a need to improve state control over corporate environmental responsibility (p.11).

With respect to business, the Energy Security Doctrine did perceive it important to increase the energy investments and investor protection;

"*[energy security is maintained by] […] the realization of investments in the sphere of energy, protecting the rights of the investors […]" (Government of the Russian Federation, 2019, p.10)*

From the Energy Security Doctrine it can be concluded that: (1) Russia considers itself an important contributor to the global energy security system. This position is threatened by the changing conventional energy demand structure, especially in

Western Europe and, accordingly, it has to find new markets. (2) Developing the renewable energy industry is acknowledged and it is suggested that renewable energy development can also generate several opportunities with regard to RES technology development. (3) The global shift towards "green politics" is deemed an excuse to hamper Russia's overall economic development. Finally, (5) Russia supports climate change mitigation as long as it does not impede its economic development.

In sum, the Energy Security Doctrine continues on the path set by the Energy Strategy. The challenges and threats can still be viewed as being somewhat inconsistent and RE energy is viewed more as threat rather than a solution. In addition, the negative view of climate mitigation policies and the confrontation between Russia and European countries is firmly expressed. In what follows, I discuss the primary data findings.

6. FINDINGS – PRIMARY DATA

"If there is the political will then yes, Russia can [develop renewable energy industry]." (LS)

In this chapter I present the findings from the empirical data according to the themes raised in the interviews. The empirical data consists for 15 interviews with energy specialists. The list of interviewees is provided in Appendix 1 and the list of questions in Appendix 2. Themes emerging are discussed according to the dimensions of the social structurationist model proposed by Aalto et al. (2012). To recapitulate, the dimensions of the model are the resource-geographic dimension, the institutional dimension, the financial dimension, and the ecological dimension. After considering each dimension, I present the main enabling and constraining factors influencing the RE industry in Russia. I begin by elaborating on the themes of the resource-geographic dimension and proceed with the financial dimension, the institutional dimension and lastly, themes emerging on the ecologic dimension.

6.1. THE RESOURCE-GEOGRAPHIC DIMENSION

"For us, oil is everything" (*YS)*

All the interviewees acknowledged the significance of fossil fuel abundance for the Russian renewable energy industry. Heavy dependence on fossil fuels was regarded as the main reason for the weak progress in renewable energy development. This can be observed in the following quote of the Finnish company representative:

"The problem of Russia's industrial politics is really a Dutch disease, the resource curse, it is just so freaking dependent on its resource incomes, due to which labor costs and inflation are high all the time." (SEO)

The interviews revealed that due to the abundance of fossil fuel, there is a persistent reluctance to change the status quo. One of specialists described the superior position of fossil fuels in the following manner:

"[…] I understood that gas is everything – cheap and easy, what do we need RES for?" (YS)

Moreover, the conventional energy sector in Russia is so big that, as expressed by one of the specialists, "no one wants to rock the boat" (Interviewee 13). Whether the business or political actors were more active in promoting the renewable energy industry did not become entirely clear. Although, in general, the business actors seemed to be more active, the opposite view could be observed, among others, in the Presidential Annual Address (2019), where President Putin highlighted the need to introduce more strict environmental requirements for companies.

The interviewees also discussed energy and electricity related infrastructure in Russia. First, it was highlighted that the energy infrastructure is rather old and needs modernization in order to be able to exploit more renewable energy sources. Secondly, the enormous infrastructure of conventional energy was regarded as a factor constraining renewable energy development. In addition, several interviewees questioned the governmental program for repairing the old energy infrastructure. This program was seen to run contrary to the targets to develop renewable energy;

"At the same time [with RES development] a very big program for modernizing the old power plants was established [by the government]. This technology is not modern nor is it stimulating the development of new technology solutions." (DB)

All the interviewees considered the technology development to be among the strongest drivers of Russia's RES development. The interviewees stated that the government's aim is to create a high-tech industry. This is pursued via the localization

requirement, which obliges RE electricity producers to organize a supply chain around their businesses in Russia which enhances technology transfer to Russia. For RES businesses the localization requirement can be seen as both an enabling and a constraining factor. From the electricity generator's perspective, localization was perceived as a constraining factor. As the company representative put it, the requirement makes it harder for companies to finish their projects "on-time, on-budget" (SEO) because organizing localized technology requires time and effort since RES technology manufacturing is not yet established in Russia. For this reason, RES technology manufacturing companies are especially welcome in Russia;

"Since nothing like this [renewable energy technology development] has been done in Russia before, only foreign companies are able to establish some kind of RES technology manufacturing here." (DB)

In addition, the localization requirement restricts companies to purchase high-level technology from abroad. Instead, they are obliged to use the lower level technology of Russian origin. This constraint was discussed in the following quote:

"I take the view that it [the localization requirement] is a constraining factor on technology development. For instance, we currently could acquire super modern and cheap Chinese solar panels, but we are not allowed to, since we are obliged to localize. If we bought the technology from China, we would be required to pay high fines. And so we only acquire the technology that is available on the market." (YS)

Moreover, the localization requirement was seen to hinder the development of the whole RES industry in Russia:

"I don't see why domestically manufactured technology should be an end in itself if the quality level is lower. […] It is stupid to develop a lower level technology sector. However, it shows that

national production and technology are more important than the renewable energy itself. Because in effect, Russia does not need it. You know, Russia needs more the technological expertise and participation in the global economy." (AK)

In relation to energy transfer, several of the specialists interviewed were of the opinion that mere technology transfer may not be sufficient to establish a functioning RES industry, as the following quotes illustrate;

"But will that [the localization requirement] have any overall impact on Russia's economy, will they learn if Siemens or Vestas will come and teach them? Or what will happen to the knowledge?" (SO)

"There is no economic culture nor are there economic mechanisms that would compel the implementation of these innovations." (AR)

"I don't doubt the technological competence [in Russia], but the capabilities to accomplish coherent projects, overall systems – these are the real problems." (AK)

Despite the burden of the localization requirement, all the interviewees agreed that from the business perspective Russia has an abundance of renewable energy sources;

"[The localization requirement and the import substitution program] are challenge, but if one manages to adjust the operations to Russia, considering, for instance, the wind power capacity, the potential is totally unbelievable." (KTT)

Furthermore, the interviewees noted that government perceives remote areas as the most rational areas for renewable energy development. It was pointed out that the current fossil fuel dependent system only benefits a "handful" of regions and those regions that do not have hydrocarbon resources are dependent on

fuel imports. These regions have an especially strong interest in attracting RES businesses:

"Mostly I consider that it [renewable energy development] is a regional phenomenon, where regions are interested in the possibilities of renewable energy since they have resources. That would increase employment and reduce [energy] purchases from elsewhere." (PA)

However, regional business opportunities depend on a region's capacity to make its own decisions. As one of the specialists explained, the central power does not support the energy self-sufficiency of energy-importing regions. The interviewee mentioned specifically the pellet industry which failed to develop further due to the absence of support from central government. Furthermore, the problem is discussed below:

"There are significant conflicts between the regional and central powers. Especially if the region is of the kind that is receiving transfer payments from central government. Those regions have pretty weak negotiating positions. [The federal government says] "You can forget that emerging pellet development. At least we won't finance it." This has happened in some regions, for instance, in Karelia." (PA)

However, not all informants regarded regional powers to be interested in renewable energy industry development, as the next quote shows:

"Our municipal organs, they really are not interested in energy savings because that won't influence their finance or salaries in any way." (AR)

Interviewees stated that Russia is not in denial regarding the energy transition and is aware of the growing importance of the RES industry. It was underlined that by developing RES now, Russia is preparing itself for the time when the energy transition really takes off;

"The political will [to develop renewable energy] is based on government's view that renewable energy is to become a global trend. Russia is not participating in the trend and it is dangerous that we do not know anything about this. Thus, a small RES niche is needed, so that we would have competency in case of sanctions and [in order to] monitor the developments of high-tech industry." (DB)

An interesting theme emerging was the waste-to-energy industry, which could be a sustainable solution to Russia's waste problem but is currently facing several challenges such as complex market access and lack of knowledge and assets. The issue was discussed in the following manner:

"Then, of course, if we think of the waste-to-energy [industry] […]. As regards Fortum […] the sky is the limit in utilizing the technology. But whether the customer [in Russia] has assets and whether the government wants to invest in it. […] Surely, that is something that Fortum should try." (Interviewee 13)

To conclude, the most enabling and constraining factors influencing renewable energy industry development on the resource-geographic dimension are presented in Table 8. Several factors may be both enabling and constraining. In addition to being constraining, the localization requirement may also offer some opportunities for RES technology manufacturing companies.

Table 8. *The most enabling and constraining factors of RES industry development on the resource-geographic dimension*

Enablers	Constraints
• Need for RES technology manufacturers	• Resource curse
	• Fossil fuel abundance
	• Enormous fossil fuel industry
	• Contradicting governmental projects (developing RE and investing in the old conventional infrastructure)
• Renewable energy source abundance	
• Need for foreign companies	• Lack of support for the regional RES development from central government
• Political anticipation of RES becoming a global trend	
• Political emphasis on developing RES in remote areas in order to improve energy efficiency	• Poor project implementation capabilities
• Regional incentives to develop RES	• Old infrastructure
• Localization requirement	• Localization requirement

6.2. THE INSTITUTIONAL DIMENSION

"Institutionally, RES is in an ambiguous state." (PA)

With respect to the institutional dimension, all the interviewees mentioned the decision-making capacity and varying interests of different actors. The significance of understanding the informal "rules of play" was underscored in the interviews. Each interviewee highlighted the importance of understanding the top-

down approach that prevails in Russia. By "top" informants referred to the political or business elite that appear to be the most important actors in RES industry development. The significance of the top-down approach is illustrated in the following quote:

"It is not like in Finland, bottom-up. Our country functions differently – everything works top-down." (YS)

The importance of informal rules in the Russian renewable energy industry were stressed by the interviewees. The problem of informal institutions in business were discussed, among others, in the Presidential Annual Address with respect to the waste-to-energy business:

"[…] It is necessary to restore order in this area, to get rid of shady businesses that do not bear any responsibility and only get super-profits while dumping trash at random sites." (Putin, 2019a)[5]

The company representatives especially highlighted the role of lobbyists in the formation of the renewable energy industry and the necessity for good government relations:

"If the political decision-making process is not engaged, nothing will happen there [in Russia. […] It is about nothing else but political will." (Interviewee 13)

In addition, good networks and public relationship were highlighted:

"Most importantly, one has to enter the markets and establish good networks as well as take care of localization requirements. [It is important] to be present when people are open for this. If

[5] Translation by Kremlin.ru

one [the company] wakes up too late, it will be harder since there are already many operators in the market." (KTT)

The joint wind power plant project between Fortum and Russian state-owned investor organization Rusnano was discussed as an example. The Fortum representative explained that cooperation is especially important because Rusnano facilitated Fortum in arranging the localization by helping Fortum's current technology supplier Vestas to localize its production in Russia. As the specialist said, it is important to *"visit, so to speak, the right cabinet, like they say in Russia",* (DB).

On the other hand, several specialists took the view that the RE industry functions according to formal rules. The finding partly contradicts the other findings and in general can be regarded as surprising since in Russia formal rules are usually seen to be rather weak (Aalto et al., 2012). However, according to AK's own research, the notion was that, compared to other industries in Russia, RES markets are functioning according to the formal rules. This is discussed in the following quote:

"The [support] scheme itself works well, the benefits received are pretty good. It feels like there is no political risk [as regards the renewable energy business]. And I thought [during the study] that where is the hidden agenda here. There was none! That was a great thing! But the reason that it [renewable energy regulation] works is that it [the RES industry] is so small. Interest has not been awakened yet, that someone would want to take over the industry or something else. The volume [of RES] indicates how little is invested in it. This is what I think." (AK)

The interviews revealed the blurred division between the politics and business in Russia:

"National politics is rather strongly defined by the development programs of operators, such as Gazprom, development programs that are defined at the state level. They speak about building a

gas infrastructure here and there. So on the one hand, there are state-level minor plans and targets for the new RE and on the other, there are state enterprises […] that generate big profits for the government." (PA)

The power of big enterprises in Russia was discussed as a constraining but also as an enabling factor of the renewable energy industry. Mostly, the powerful businesses are from the conventional energy sector and their interest is primarily to develop the hydrocarbon business. This was explained by one specialist in the following manner:

"The overall trend [in the RES industry] is the kind of constant existence of [RES] potential that struggles to be unleashed because of these reasons [strong ties between the government and business]." (Interviewee 13)

Even though company representatives agreed that the waste-to-energy industry is interesting, the problem seems to be regulation, which has prevented everyone else but big state-owned companies from entering the market;

"The support scheme [for waste-to-energy] was designed in such a way that the industry is in fact monopolized by the state-owned companies. This happens from time to time, when the industry is […] not available to private investors, foreign or domestic, because the government has developed a support scheme for one company with the state-ownership." (DB)

However, if a big state-owned company is interested in developing the renewable energy industry, its power to lobby was viewed as an enabling factor, as can be seen in the following quote:

"A Russian state-owned enterprise called Rusnano is one of the biggest lobbyists of the RES industry [in Russia]. Now it is

actively working on its proposals to extend and develop the RES support scheme further." (Interviewee 8)

In general, energy policies were deemed rather static. Informants did not expect renewable energy sources to gain notable shares in the overall Russian energy mix. One of the interviewees discussed Russian inertia in the following way:

"I see the kind of static [energy] politics that derives from the energy strategies from the early 2000s, where the core idea is to increase hydrocarbon generation. It is the goal." (LS)

In addition, the following quote from a company representative corroborates the literature as well as my findings (see for instance Pristupa and Mol, 2015; Smeets, 2017) that the governmental targets are inconsistent and the emphasis is put on conventional energy development, which is decidedly unstimulating for renewable energy actors:

"In sum, there are two contrasting trends [in the Russian energy sector]. On the one hand, the government is developing the renewable energy industry; on the other hand, there is this ineffective modernization program [of the old energy infrastructure] that is not going to lead Russia to any kind of technological breakthroughs." (DB)

One of specialists even denied the existence of a consistent energy policy:

"There is no consistent energy policy in Russia. There are random decisions for which random people receive random approval from the government or the president." (Interviewee 8)

Company representatives highlighted that from a business perspective, semi-liberalized electricity markets are a constraining factor in RES industry development, as appears in the following quote:

"[…] you need to liberalize the electricity markets. […] but the problem is that in Russia no politician really believes in it [in a liberalized electricity market]." (SEO)

Moreover, a few informants explained that Russia has a power surplus due to the semi-liberalized markets:

"For companies it is cheaper to maintain old, inefficient electricity facilities that have big emissions because the government is not fully liberalizing the market. There is no classic model of demand-supply. […] The government is interfering everywhere and that weakens market signals." (DB)

The implementation gap (see for instance Smeets 2017; Lanshina et al., 2018) was also mentioned by several specialists and as one of the interviewees noted: *"There are rhetoric and programs but no real changes."* (Interviewee 13). However, the business representatives interviewed did not identify this problem.

The interviews revealed that government officials are quick to adjust the RES support scheme as field experience accumulates. As the interviewees pointed out, the RES regulatory framework was to a large extent built from scratch with a lack of knowledge and experience. Over the course of time, the support scheme was improved. This process was illustrated in the following quote:

"Well there are some incomplete moments in the regulatory framework. […] Like it has not quite been thought through. For instance, the regulation requires having someone in the solar station at nighttime and coordinating the generation, but what generation can there be at nighttime? This is not a problem; these are just imperfections of the program and they are gradually being improved." (YS)

Furthermore, the Finnish energy company Fortum faced challenges with the Russian regulatory environment after its takeover of Uniper. However, the CEO of Fortum, Pekka

Lundmark, was successful in lobbying for a regulatory change by expressing his concern to President Vladimir Putin (Hartikainen, 2019). This shows that even though the Russian regulatory environment does not seem fruitful for businesses, laws and regulations can be adjusted. This is especially the case when foreign businesses are deemed valuable by high-ranking individuals in Russia.

In addition, the institutional dimension entails social factors and popular attitudes. The interviewees made many interesting observations about Russian attitudes to RES. Mostly these can be regarded as constraining factors. Frequently emerging themes were the Russian *mentality* and *ideology* that distinguish Russians from Europeans, as is promptly expressed by the Russian interviewees:

"There is a common ideology in Europe, we [Russians] have a different ideology." (AR)

"How could that [the renewable energy] be applied to Russia? I understood that it would be really challenging because we have a different mentality. […]" (YS)

All the interviewees highlighted the constraining factor of RES development emanating from people's indifference to renewable energy:

"If we talk globally [in Russia], people don't care." (DB)

Interestingly, the Russian company representatives noted that the perception of RE in regions where RE power plants are built is more positive:

"There is no public opinion of RES in Russia. The opinion exists only in foreign countries but in Russia, there is enough coal and gas to ensure its energy supply for many years to come. In those regions that develop renewable energy, public opinion is

changing for the better. But there are just a few of these regions." (Interviewee 8)

"[…] people who have wind power parks next door; they usually regard it as a positive thing. It's like sightseeing, something exceptional and beautiful."(DB)

However, it is important to understand that the "Russian ideology" described is only a projection of the Russian reality, as stressed in the quote below:

"The research always highlights that climate change issues are remote problems for Russians since they have so many everyday problems to deal with. A Russian acts upon his/her beliefs and context in a very rational way. […] There is no inbuilt avoidance of climate issues…" (AK)

As already noted, government interest in developing RES in remote areas is also incentivized by the social factor. For instance, a representative of an environmental NGO stated that RES development in remote regions is motivated by substantially different factors than in non-remote areas;

"…It is small-scale [RES generation in remote areas]. Remote areas include a social question. […] [RES needs to be developed] in order for people [in remote areas] to have electricity. [it is also a] question of [fuel truck] drivers, who often die [on their trips to deliver fuel]." (ALK)

As was revealed in the secondary data analysis, the specialists also discussed the social relevance of the conventional energy sector. Since the renewable energy is perceived as a substitute especially for coal and oil, it is viewed as a threat to people's livelihoods. An interesting example was provided by an interviewee in relation to the coal industry:

"The problem with coal is really enormous in Siberia since many people are living off coal. They have all moved there to work in

the coalmines. I feel that there is some kind of a social protection of coal [by the government] in the sense that if they close the coalmines, cities will simply start to wither away. That is why coal is protected in Siberia." (EV)

Hence, even though it is acknowledged that the coal is a dirty source of energy, its socio-economic relevance is given precedence over its effects on the environment. This theme was similarly discussed in the Presidential Annual Address:

"[It is important to] to map out the specific steps they should take to minimize environmental damage, and to register all this in a law on emission quotas. […] I know that fairly influential lobbyists are trying to impede this draft law as much as they can. I know their arguments very well, too: the need to preserve jobs and a complicated economic situation." (Putin, 2019a)[6]

As the interviews revealed, climate change is not discussed from an ecological point of view but rather from the perspective of the national security. This was elaborated in the quote below:

"[the official view is that] Climate change is used as an excuse for the European efforts to develop a low-carbon economy, which is a threat to Russia. If they [the Russian government] do not quite understand that the climate is the reason then let them think it is an excuse. It would be worse if they would think nothing at all." (AK)

Overall, the view was that it is a conscious political decision to keep RES development rather small. Table 9 presents the most enabling and constraining factors on the institutional dimension:

[6] Translation by Kremlin.ru

Table 9. *The most enabling and constraining factors of the RES industry development on the institutional dimension*

Enablers	Constraints
• RES support scheme	• Localization requirement
• Strong influence of big companies	• Strong influence of big companies
• Lobby	• Weak social acceptance of climate change
	• Lack of understanding of RES
	• Lobby
	• Top-down approach
	• Arbitrary government
	• Political will to keep RES small
• RES industry functions according to the formal rules	• High political emphasis on the conventional energy sector
	• Lip service payed to RES
	• Unpredictable business environment
	• Inconsistent energy politics
	• Controlled energy markets – inefficiency
	• Social role of the conventional energy sector

6.3. THE FINANCIAL DIMENSION

"It [renewable energy industry] is not so much of an outcome of political will as it is of lobbyists. Ten years ago, someone saw money in this industry and started to lobby." (DB)

All the interviewees highlighted the significance of the financial dimension with regard to RES development in Russia. It was noted that as long as renewable energy sources do not become cheaper they cannot compete with conventional energy. The situation was promptly described by a specialist as follows:

"[the share of renewables in Russia is small because] It [gas] is so cheap. Absolutely. Gas prices are monstrously low." (ALK)

Furthermore, the interviewees considered that, despite the on-going international discussion about the energy transition, it is not yet visible in the global energy demand structure. This was elaborated by an interviewee in the following quote:

"The production of gas and oil is at high levels, so there are customers. Therefore, it is all good. The situation is not bad for Russia. Russia can still acquire enormous profits, but where they will invest – in the future or in something else."(AP)

Accordingly, it was stressed by several interviewees that, for instance, coal exports to China are increasing. Moreover, the development of the European and Chinese energy markets was deemed an important determinant for Russian renewable energy development:

"As long as gas can be sold to someone, there will be no rapid changes in the Russian energy system." (EV)

Interestingly, financial considerations were also regarded as a constraining factor for the waste-to-energy industry. Despite the fact that waste-related issues have given rise to protests;

"The challenge of waste-to-energy lies in cheap conventional energy. Moreover, Russian people look at it from the rather narrow perspective of economic benefit. […] Russians are interested in its price." (KTT)

The problem seems also to be the lack of capacity to provide any real solutions to the waste problem as discussed by the Russian president:

"This year, the regions began adopting a new system of solid municipal waste management. However, if the only change is a rise in rubbish clearance prices – well, this is not real work; it is a sham. People need to see what they are paying for and what real changes are happening." (Putin, 2019a)[7]

Informants estimated that for businesses the RES support scheme is very favorable and functions as an enabling factor for the renewable energy industry. It provides a safe business environment for investors and decreases the country's risk. Due to the generous support scheme, the RES market provides guaranteed, long-term income for RES electricity generators, which is rare in Russia. A company representative put it in the following way:

"This is pretty foolproof profit" (SEO)

However, a few specialists stated that the "generosity" cannot last forever. In addition, the NP Market Council representatives stressed the high price of RES. They emphasized that those wholesale customers that are not concerned about their emissions are not content to pay a higher capacity price to support renewable energy. The NP Market Council representatives claimed that renewable energy sources should start to operate by the same rules as the conventional energy sources.

Interviewees confirmed the secondary data findings by underlining that RES development is incentivized by the need to acquire direct investments, especially in the remote areas.

[7] Translation by Kremlin.ru

However, from the business perspective remote areas entail a much higher economic risk. For instance, because remote areas are not included in the RES support scheme, a company has no income guarantees:

"[…] The regional governors, they say that invest here. But unless it is deemed profitable, no one will. What is the incentive for company X to invest exactly in place Y? This part is missing. They just say invest here and produce things in Russia. […] It feels that regional governments sometimes forget that it needs to be profitable for Western countries as well." (KTT)

However, the interviewees shared the opinion that even though, on the macro-level, the renewable energy industry is not big in Russia, from an individual company's perspective the financial opportunities presented by the Russian RES markets are substantial.

The interviewees stressed the strong presence of big, state-owned companies in the RES market, which is due to the localization requirement. Market entry with small capacities is not possible since in order to attract a manufacturing company to Russia, one has to order big production volumes. As one of the interviewees pointed out, small and medium-sized businesses lack "the muscle to enter the game" (SEO).

The interviewees explained that because of the RES support scheme that provides a long-term investment shield, the financial institutions are increasingly interested in the RES industry.

"The capacity-based support scheme is very attractive, safe, and guaranteed. For instance, when we were entering the solar market [in Russia], several banks were rushing to finance us. This also demonstrates the trust for the support scheme." (YS)

Moreover, the interviews revealed that the future anticipation is that pension funds will be able to invest in the RES industry, as discussed in the quote below:

"[…]Russian pension funds that are quite many have really big assets but at the moment they are not legally allowed to invest in RES. […] The regulatory framework for pension funds is very strict [in Russia] and they have really conservative regulations determining which industries they are allowed to invest in." (DB)

Enabling and constraining factors of the RES industry on the financial dimension are presented in Table 10.

Table 10. *The most enabling and constraining factors of RES industry development on the financial dimension*

Enablers	Constraints
• Availability of financing	• Poor opportunities for renewable energy to compete with the poor prices of conventional energy
• Guaranteed long-term investment shield guaranteed by the RES support scheme	• The social consideration to put economy before ecology
• Financial benefits seen in the RES industry by some lobbying coalitions	
• Stable and guaranteed investment shield provided by the RES support scheme	
• Fewer business incentives to invest in RES in remote areas vs. political emphasis on developing RES in remote areas	
• Increased investment interest in RES industry	

6.4. THE ECOLOGICAL DIMENSION

"Climate change has been the key driver to develop renewable energy [globally]. But Russia still holds on to the belief that, partly, it [climate change] is a natural process that cannot be influenced. We interviewed Russians […] so mostly, the belief is that it [climate change] is a natural phenomenon." (AK)

The minor relevance of the ecologic dimension in the Russian renewable energy field became apparent from the interviews. As concluded by all interviewees, RES development is considered more from the technological point of view – how to establish a high-tech industry around the RES business. Accordingly, the consumption of renewable energy is not at the core of RES development in Russia. From an early stage, an experienced researcher recommended the following:

"Don't consider environmental issues as a leading factor at all [in Russian RES development]. Since we [Finnish people] think the environment this and that, so our thinking is easily biased. […] There are national [Russian] researchers saying that they have evidence that climate change is a naturally occurring process [and not caused by humans]." (AK)

One of the interviewees, a Russian researcher, confirmed the above statement in the following manner:

"The anthropogenic factor of climate change is approximately from 1 to 2%" (AR)

Regarding the ecological dimension, all the interviewees highlighted the indifferent attitude of Russian people towards renewable energy. In addition, the European Social Survey shows that fewer than 20% of Russian citizens are worried about climate change (European Social Survey, 2018). The specialists noted that the higher price of renewable energy is not justified by

the fact that it is clean, as can be observed by the following comment:

"So, if you say [to a Russian person], what if you pay a ruble more and in return you would invest in clean energy, [the answer would be that] Are you mad? Rather tell me how to save money. Thus, the preference is to save money." (YS)

However, the interviewees observed that there is a new group of young, urban people increasingly concerned about environmental issues. In this regard it was stated that small changes in the perception of renewable energy are taking place in Russia:

"If before it [RES] was perceived as a toy for someone in California or somewhere there in Europe and as something not suitable for Russia, now the idea has emerged that the time will come when RES will probably be the most important source of energy. […] People start to see this as something rather serious, but in the future, not now." (ALK)

Furthermore, it was conceded that the world is changing, and that Russia will change with it. Companies in Russia will have to start considering the ecological dimension more since the pressure from the customers will increase:

"But if we speak globally, the world is moving towards being more aware of consumption of everything and potentially, there will be increased demand for the green component in the product. Exporting companies [in Russia] will be required to consider this. Already now many organizations are part of the RE100 initiative and they have targets that by a certain moment their manufacturing should be emission-free. Ikea, Unilever, the beer industry etc. Since we [Fortum] are the leader in the RE industry they all come to us and ask if we would sell them green kilowatt-hours. We are the first ones to deliver clean energy for the

Unilever facility. We also have requests from Ikea. We are still far away, but the gap is narrowing." (DB)

Fortum collaborates actively with big companies interested in acquiring green certificates:

"We are the first ones to deliver a certified product [electricity] to end-customer [in Russia]. It may be important for global companies that their Russian operations are based on renewables. Russia lags behind the rest of the world [in the green certification system]. In India, Indonesia or China one has been able to purchase certified renewable electricity for a long time. In Russia, this has not even been thought through. We, as a company, have been trying to create some kind of a solution. Right or wrong. I hope there would be more awareness in relation to RES and the demand would increase." (SEO)

The increased need for certified sustainable energy was also discussed in the meeting with the NP Market Council representatives.

Moreover, the importance of "being green" in the international arena was discussed. Several interviews suggested that renewable energy is used more as a tool for international arenas and for political dialogue;

"We [researchers] have been referring to it as window dressing. So that one has beautiful and good things, that can then be written about." (AK)

Interestingly, few of the Russian specialist interviews indicated that the attitude towards renewable energy was defensive. In addition, the ecological dimension was taken into account in relation to renewable energy. For instance, the environmental friendliness of RE technology was questioned by the NP Market Council representatives and the ecology of wind turbines is questioned in the following quotes:

"Wind turbines, they are manufactured using traditional energy. And how much is that producing in emissions? No one has ever calculated the whole cycle, no one. How much energy it requires […]"(AR)

"I have only heard that, for instance, some geologists might protest against wind generation facilities because they are interfering with birds' flight paths, or something relating to that." (YS)

Table 11 presents the most enabling and constraining factors of renewable energy industry development on the ecologic dimension:

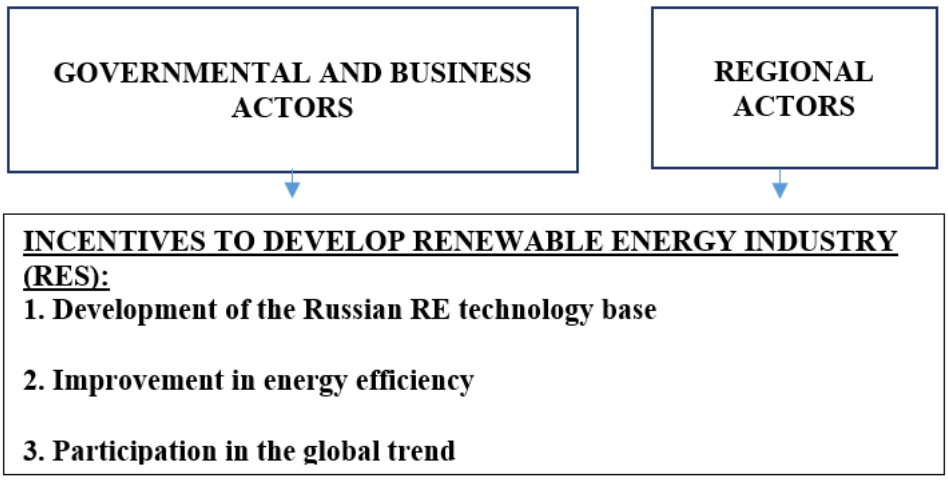
Table 11. *The most enabling and constraining factors of the RES industry development on the ecologic dimension*

Enablers	Constraints
• Rising group of environmentally aware people	• Russian attitude towards climate change
• Rising external pressure to consider more the ecologic dimension in the decision making	

7. ANALYSIS AND DISCUSSION

"I take the view that this question [of renewable energy development in Russia] is a question of Russia's future. (Anatoly Chubais, 2018)

In this chapter, in order to tackle the main research question "*What factors enable and constrain the development of the renewable energy industry in Russia?"* key findings from the secondary and primary data are analyzed in light of the preceding research. The secondary data findings, the governmental energy strategy documents, and presidential speeches revealed that the energy industry is extremely relevant to Russia's overall political, economic, and social stability. Accordingly, an increased effort by European countries to diversify energy sources is considered more as a threat than as a business opportunity in Russia. However, Russia places great emphasis on becoming an exporting RE technology manufacturer. The primary data revealed that even though, on paper, the government aims to develop the RE industry further, the industry shows no signs of prospering and is still very small. In what follows I introduce a framework developed on the basis of the empirical findings (see Figure 10). The framework has been adapted from the social structurationist model of Aalto et al. (2012, 2014). Based on the research findings, it presents the most important energy policy actors, their incentives to develop the RE industry in Russia as well as the most enabling and constraining factors of the RE industry development from each dimension of the social structurationist model.



RESOURCE GEOGRAPHIC	INSTITUTIONAL
• Resource endowment (E&C) • An aim to develop Russian technology (C&E) • Poor infrastructure (C) • Waste-to-energy industry potential (E)	• Localization requirement (C) • Incompatibility of formal and informal norms (C) • Insufficient knowledge of RES (C) • Governmental protection of conventional energy industry (C) • Belief that climate change is an excuse for discrimination against Russian companies (C) • Inconsistent governmental targets (C) • Top-down approach (C)
FINANCIAL	**ECOLOGICAL**
• Increased investment interest (E) • Investment shield for RES investments (E) • Low prices of conventional energy (C)	• Increasing environmental awareness (E) • Increased influence of climate change (E) • Anthropogenic factor in climate change is questioned (C) • No cause-effect relationship between the conventional energy sources and climate change (C)

Figure 10. *Research findings presented in the modified social structuration model by Aalto et al., 2014*

Firstly, I suggest that the main actors of the Russian RE industry are (1) governmental and business actors and (2) regional actors.

These findings are corroborated in the literature identifying the main energy policy actors in Russia to be the political and business elites (Levitsky and Way, 2010; Aalto et al., 2012). Since the interviews revealed contradicting interests between central and regional governments, these governing bodies are situated in different boxes. The literature also suggests that lack of support from central government as well as unwillingness to change the current centralized market design is a challenge for RE development (Boute, 2013; Pristupa and Mol, 2015; Khokhlov et al., 2019). The social structurationist model also identified other actors, such as NGOs. However, the interview findings did not identify NGOs as relevant actors in the Russian RE industry.

Based on the empirical findings, I have identified the three most prevalent incentives of the industry actors identified to develop the renewable energy industry in Russia. The first incentive seems to be the development of the Russian RE technology base. The findings suggest that the aim is to acquire knowledge from foreign companies and to start to develop and manufacture RE technologies. These findings concur with the conclusions of Smeets (2018) and also of Boute and Zikharev (2019) that technology is an important driver to develop RE in Russia. According to the findings from the data, the second most important incentive is the aim of enhancing energy efficiency in Russia by replacing the inefficient and expensive energy supply in the remote areas with renewable energy. This finding is supported, for instance, by the work of Ermolenko et al. (2017). Lastly, the findings show that since RE development is taking place all over the world, it is important for Russia to be involved in the trend and in the international discussion.

I have also identified the most enabling and constraining factors of the Russian renewable energy industry from each dimension. For instance, enabling factors include Russia's vast renewable

energy resources (resource-geographic), the business potential of the waste-to-energy industry (resource-geographic) and increased investor interest.

As discussed (see pp.26-27), Russia has considerable waste problems that provide business opportunities for waste-to-energy companies. However, the market entry of investors is hampered by several regulatory challenges. As one of interviewees noted, the policies only serve a small number of big, state-owned companies. This makes market entry for interested companies practically impossible. The findings are backed up by the literature on the incompatibility between formal and informal institutions in Russian waste management (De Silva et al., 2019). On the one hand, society and the government seem to agree upon the need for changes (Korobova et al., 2019). For instance, in his annual address, President Vladimir Putin addressed the problem of waste management in the following way:

"It is necessary to restore order in this area [in waste management], to get rid of shady businesses that do not bear any responsibility and only get super-profits by dumping trash at random sites." (Putin, 2019a)[8]

On the other hand, the state authorities are not ready to liberalize the industry and thereby they perpetuate its inefficiency. The specialists interviewed also described waste-to-energy industry as largely dominated by informal networks. The interview findings of this study support the literature suggesting that Russian business has connections to political actors with political interests and vice versa (see for instance Aalto et al., 2012; Gel'man, 2016; Smeets, 2018; Boute and Zhikharev, 2019). In addition, in the interviews, the ability and willingness of Russian

[8] Translation by Kremlin.ru

customers to invest in enhanced waste management was also questioned. Nevertheless, there is public pressure to improve waste management. People are protesting and voicing their dissatisfaction with the current insufficient and corrupt waste management system (Seddon, 2019). This industry offers several opportunities for companies since Russia lacks the knowledge and experience to solve the issue (Chubais, 2019). Russia will hence need the knowledge and competence of foreign waste management companies in particular.

The findings moreover indicate an increasing interest on the part of investors in the RE industry. For instance, as explained by a specialist interviewee, the Russian pension fund is currently not allowed to invest in renewable energy. However, the anticipation is that this is about to change. In addition, the literature reports the increasing investment interest among conventional energy companies in the renewable energy industry (Boute and Zikharev, 2019). Furthermore, since big companies are increasingly pressured to add a sustainability aspect to their operations, there is an ongoing discussion about the development of the green electricity certificate system, which would enable companies to purchase certificates which would confirm their use of sustainable energy sources (see also Vavina, 2019).

Next I take one constraining factor from each dimension under further scrutiny. I consider that the chosen constraining factors are the most prevalent and deep-rooted constraints on Russian RE industry development.

The resource-geographic dimension

"For us, oil is everything" (YS)

To briefly recapitulate, the resource geographic dimension involves material features of reality, such as uneven distribution of energy, access to resources, and the technological means used to extract, develop, and transport energy (Aalto et al., 2014).

On the resource-geographic dimension, the findings highlighted the omnipresence of the conventional energy sector which can be considered to be one of the most constraining factors of RE development in Russia. The primary and secondary data findings revealed that the conventional energy sector is of financial, political, and also social relevance. First, regarding political relevance, the findings highlighted the important role of oil and gas in Russia's geopolitics. Second, the conventional energy sector allows the ruling elite to maintain the political stability by providing cheap electricity. The literature explains this factor to be a legacy of the Soviet Union, where people expected to be provided with cheap electricity which accordingly, maintained political and social stability (Balmaceda, 2013; Godzimirski, 2013). Thus, cheap energy can be viewed as a bargain between the state and society that legitimizes the elite's power position.

The research findings revealed that the conventional energy sector has a major role in socio-economy since it provides many jobs and finance for the social institutions and is thus protected by political institutions. Consequently, the renewable energy industry is seen as a threat to the conventional energy sector. In addition, as discussed, the export of oil and gas has a substantial economic relevance for the Russian state economy, accounting for approximately one fourth of Russia's GDP (IRENA, 2017). In sum, the findings imply that the RES industry in Russia can only grow so long as it does not encroach on the interests of the conventional energy sector.

The institutional dimension

"It is not like in Finland, bottom-up. Our country functions differently. Everything works top-down." (YS)

The institutional dimension involves informal and formal institutions as well as factors concerning international relations and societal beliefs and values (Aalto et al., 2014).

On the institutional dimension, an important factor in the discussion was that in Russia everything is dictated from above. It was mentioned by several interviewees that it is a political decision to not to develop the RE industry and whenever the political will exists, the renewable energy development will accelerate. Moreover, Smeets (2017) has stressed that RES policies are dictated top-down and the industry is under the close scrutiny of the energy elites (see also Petrov et al., 2014).

The strong influence of the top-down and centralized management approach can be seen, for instance, through different interests between the regional and central governments. As one of the specialists explained, there are regions that would be interested in developing the renewable energy industry but they do not receive sufficient support from central government. Moreover, as the Energy Strategy suggests, the central control is only going to be tightened in the years to come.

The financial dimension

"It [gas] is so cheap. Absolutely. Gas prices are monstrously low." (ALK)

The financial dimension includes all factors having to do with financial aspects (Aalto et al., 2014).

The interviews as well as the Energy Strategy revealed that the strongest competitive disadvantage of renewable energy was its high price in comparison to the "monstrously" low gas prices (ALK). Moreover, the Energy Strategy indicated that the renewable energy sources are implemented in the energy system only to the extent that is economically feasible. Accordingly, this poses a challenge to the renewable energy business where the initial expenses are especially high (see for example Handayani, 2019).

The conventional energy prices are low to the extent that they do not cover the costs of production (Korppoo and Korobova, 2012; Khokhlov et al., 2019). Moreover, in housing, Russians do not have control over their heating; it is centrally controlled (Korppoo and Korobova, 2012; Khokhlov et al., 2019). Due to this, the literature has noted that the development of renewable energy is mostly seen as a threat to Russia's economic development (Smeets, 2014a; Sharmina, 2017). Hence, it is hard to determine how much energy one consumes and what its real value is. My interpretation is that Russians are rather distanced from the value of energy because of low prices and their inability to control their energy use.

The ecological dimension

"The anthropogenic factor of climate change is approximately 1 to 2%" (AR)

As one of the specialists interviewed said at the beginning of my research, environmental factors should not be considered as leading the RE development in Russia. The empirical findings confirmed that the incentives to develop RES in Russia do not derive from ecologic considerations. In addition, the literature states that the incentives to develop RE in the energy-exporting countries are different from those in the energy-importing countries (see also Klochikhin, 2012; Smeets, 2017). In addition, the findings reveal that serious concern about climate change is lacking. Magun and Rudnev (2010) go as far as to say that Russia's cultural self-interest leaves little room for concern for others, nature, and the environment. However, there may be other reasons for this. For instance, most of the specialists interviewed agreed that there is a lack of knowledge about climate change issues as well as about renewable energy in Russia (see also Smeets, 2018). This affects renewable energy development since, according to Dusseault (2010), the lack of knowledge can lead to

suboptimal decisions. All the specialists claimed that Russians "think differently" when it comes to climate change and renewable energy development. For instance, the findings revealed a suspicion of climate change and alternative energy:

"One big societal belief is the conspiracy theory. That everything is against Russia [like] climate change. That […] climate politics is something that is used to hinder Russia's economic development […]." (AK)

Interestingly, the findings indicated that with respect to renewable energy, the ecological dimension is more considered than in the case of conventional energy. For instance, one of the Russian specialists was concerned about the effect of wind turbines on birds. In addition, the representatives of the NP Market Council doubted the environmental friendliness of renewable energy technology. Moreover, President Putin expressed concern about the environmental friendliness of wind turbines:

"Will it be comfortable to live on a planet covered by wind turbines and several layers of solar panels? As they say in Russia, it is like sweeping the rubbish under the rug instead of just cleaning the house. Everybody knows that wind power is good, but is anyone thinking about the birds? How many birds die? They shake the ground so much that the worms crawl out. This is not a joke really; it is a serious side effect of these modern modes of energy generation. I am not saying it should not be developed, of course it should; but let's not forget the related problems." (Putin, 2019b)[9]

[9] Translation by Kremlin.ru

Even though climate change and its impact are acknowledged, the anthropogenic factor of climate change is not. Overall, the primary and the secondary data showed that there is no discussion of the conventional energy system being a major polluter. Moreover, there was no discussion of a need to substitute conventional energy sources with renewable sources. The responsibility for the conventional energy sector is not generally discussed. For instance, in the Sakha Republic, the rising temperature severely affects the region by melting the permafrost, which results in the collapse of the foundations of buildings. In an article in the *Financial Times* (2019), the head of the region, Mr. Nikolaev, declined to criticize big producers of carbon dioxide for fueling climate change. Instead, he noted, "everyone has their own responsibility". Thus, an interpretation can be made that there is no cause-effect relationship discussion between the conventional energy system and the climate change. However, the specialists interviewed highlighted that there is an increased environmental awareness among the younger urban generation in Russia.

To conclude, it seems that in Russia climate change is not perceived as a big threat as climate change mitigation policies undertaken by the Western European countries. Moreover, the general idea seems to be that policies undertaken are not designed to mitigate climate change but to discriminate against Russian energy companies:

"[External economic and political threats are] the discrimination against Russian energy companies in global energy markets through the changes in the international legislative system, among others, under the pretext of climate change mitigation and environmental politics or energy import diversification strategies." (Government of the Russian Federation, 2019, pp. 4-5)

In addition, the Energy Security Doctrine states:

"[The Russian Federation] is participating in the international climate change discussion to the extent that is in line with its national interests. […] [The Russian Federation] does not engage in the biased climate change discussion that undermines the interests of resource producing countries […]" (Government of the Russian Federation, 2019, p.4)

Hence, strategies do not indicate that there is a strong political will to develop RES and transform its current systems and from the national interest perspective, there is rather little space for RE to develop in Russia.

8. CONCLUSIONS

"I cannot forecast to you the action of Russia. It is a riddle, wrapped in a mystery, inside an enigma; but perhaps there is a key. That key is Russian national interest." (Winston Churchill, October 1939)

The famous saying of Winston Churchill seems still to hold true – the national interest is the key also in understanding the development of the Russian renewable energy industry. Russia, like any other energy-exporting economy, benefits from the current system and thus energy transition is contrary to the Russian national interest. Russia wants to see itself as a great power and its fossil fuel reserves are one of the key components to maintain that status. Considering the blurry division between the politics and business in Russia, the development of the renewable energy industry will not be purely business-driven; political incentives will influence the development of the RE industry.

8.1. RESEARCH SUMMARY

This study shed light on the RE industry development in the energy-exporting country, namely Russia. It shows that the conventional energy sector is a financial, political, and social necessity and that climate change is not yet acknowledged as an alarming problem in Russia. In this chapter, I will first go through the main results from the literature review and then summarize the main findings.

The literature review yielded two main important notions. Even though there is a sound RE support scheme, the number of RE projects actually implemented is still small in Russia (Smeets, 2017; Lanshina et al., 2018.) The RE support scheme will yield a 12% return on investment for 15 years (Boute, 2012, 2016; Lanshina et al., 2018; Government of the Russian Federation,

2018). Thus, investors have a guaranteed investment shield, which substantially decreases the country risk.

Strikingly, despite the favorable regulatory framework, the share of renewables in the overall energy mix is only around 0.2% (Polyansky, 2019). This implementation gap between the RE targets and actual implemented projects, has been noted in the literature. Scholars explain the implementation gap, among others, with two factors. First, there is a mismatch between formal and informal rules as well as inconsistency in the RE targets (e.g., Smeets, 2018). These inconsistencies do not enhance trust nor do they attract new businesses to the industry. Second, the implementation gap has been explained by the strict localization requirement. The localization percentage for solar technology is 70% and for wind and hydro technology 65% (IEA, 2019). For businesses, the localization requirement is constraining financially and timely and thus decreases the attractiveness of the market. If the company does not follow the requirements, the remunerations will be reduced by over 50% (IRENA, 2017).

The theoretical framework was based on the social structurationist model by Aalto et al. (2012, 2014). The model makes sense of the Russian energy policy environment by identifying the main energy policy actors, their incentives, and the various factors they consider when making decisions. The factors considered are divided into various dimensions.

Actors base their decisions on factors from various structural dimensions. Aalto et al. (2012, 2014) divide the Russian energy policy environment into four structural dimensions: resource-geographic, institutional, financial and ecological. Each of these dimensions includes constraining and enabling factors. In the ideal situation, while making decisions, actors should consider factors from all dimensions. In reality, however, the decisions are

conducted based on the single dimension. Aalto et al. (ibid) identified the most important operators of energy policy environment to be business and political actors.

The research findings aimed to identify what factors enable and constrain the development of the renewable energy industry in Russia. I used two data sets in order to conduct the study: the secondary data set consisted of governmental energy strategies (the draft Energy Strategy of the Russian Federation until 2035 and the Energy Security Doctrine of the Russian Federation) and presidential speeches (Putin, 2019a; Putin 2019b) whereas the primary data set consisted of 15 interviews with energy specialists. The interviews were transcribed and thematically analyzed.

The findings of the study are illustrated through (see Figure 10) the adjusted social structurationist model of Aalto et al. (2012, 2014). On the basis of the empirical findings three of the most important actors of the RE industry were identified: central government, business actors, and regional governments. They formulate the RE industry in Russia on the basis of their own interests. The empirical findings revealed several enabling and constraining factors from each dimension. The enabling factors are, among others, increased investment interest in RE, abundance of renewable energy sources and the potential of the waste-to-energy industry. The constraining factors include the omnipresence of the fossil fuel industry in Russia, the top-down managerial approach, low gas prices, low concern over sustainability-related issues and lastly, high political suspicion towards the climate change and its mitigation policies. These issues are deep-rooted societal factors that can only be changed over time. In what follows, I discuss several suggestions provided by the experts interviewed to improve the RE development in Russia.

8.2. SUGGESTED SOLUTIONS

The study design of this research is primarily descriptive and the aim is not to provide solutions or to make policy recommendations. However, since several of the specialists interviewed mentioned possible solutions for the sluggish renewable energy development, I will briefly discuss them in this chapter. These solutions could be summarized into five main points: (1) less state intervention; (2) better understanding of climate issues; (3) decreased localization level, (4) decreased political focus on the conventional energy sector and (5) courageous decision-making.

Several specialists highlighted the need for further market liberalization. The state intervention was viewed to disrupt market signals, maintain the informal business environment as well as strengthen the inefficiencies of the electricity market.

Even though the specialists took the view that currently there is greater awareness among the younger urban generation they also noted the insufficient knowledge about the climate change issues. It would thus be important to raise awareness and accordingly, the public pressure to develop renewable energy in Russia.

Based on the interviews, from the business perspective, the localization requirement was viewed as a burden and thus less localization would facilitate business. However, this would not serve the purposes of the Russian policy-makers. Following the Chinese example (see page 18), in the long-term, the localization requirement may result in achieving Russia's strategic goal to establish a high-tech manufacturing industry and become a RE technology exporter.

In addition, the overall political focus on the hydrocarbon industry was discussed to be highly detrimental to RE investment. Thus, it would be valuable to decrease the amount of investments in old and inefficient hydrocarbon infrastructures.

Furthermore, the lack of courage in Russian decision-making was discussed in several interviews. It was reported that in order to develop something new, risky and courageous decisions should be taken (see also Tynkkynen, 2019).

The most prevalent issue was seen to be the lack of political will to develop RE industry. Thus, the final solution is to wait until the ruling elite take the RE industry more seriously. The research findings revealed that the main challenges are structural and have been embedded in the system for many decades. Overcoming these will be neither quick nor easy.

8.3. MANAGERIAL AND POLICY IMPLICATIONS

With the help of the wide contextualization, this thesis provides an in-depth overview of the Russian electricity and renewable energy markets. Within the framework of the main topic, this thesis has covered a wide array of themes by taking into account the business, political, and societal perspectives. Since a common problem is seen to be a lack of understanding of Russia and its operating environment (Niemeläinen, 2019), this study makes its contribution to the issue. I believe that this study is relevant in Europe, where renewable energy has a very different status in the society.

With respect to the managerial implications, this research facilitates the market analysis. It sheds light on Russian renewable energy industry development and reveals cause-effect relationships by identifying the main actors and their incentives to develop the renewable energy industry as well as factors either constraining or enabling the RE industry development.

The findings of this study also have policy implications. For Russian policy-makers this study may be beneficial since it identifies the most crucial areas of development in the renewable energy industry and its regulatory framework. Furthermore, the findings identify Russian strategic plans in relation to energy and

the strong relationship between geopolitics and energy issues which may be beneficial for policy- and other decision-makers abroad. In addition, this study enhances foreign political actors' understanding of the position of the energy-exporting countries in the climate change discussion. Moreover, I believe that this study benefits the international climate and energy organizations by providing a status review of renewable energy development and, in general, of the Russian climate change discussion.

Finally, even though, this study did not aim to produce generalizations but concentrated primarily on one case and its analysis, I believe that some of the research findings can serve as a reference point in other emerging energy-exporting countries.

8.4. LIMITATIONS OF THE STUDY AND SUGGESTIONS FOR FUTURE RESEARCH

This study has provided a holistic view of the Russian renewable energy industry by identifying its most enabling and constraining factors. However, it has several limitations that should be taken into consideration.

As indicated, the interview questions were modified according to the interviewees' professional backgrounds. I claim that especially for a less experienced researcher, as I appear to be, it would be beneficial to use a stricter interview framework. It would have facilitated the data analysis process.

Furthermore, it should be taken into account that the specialists interviewed were only Finnish or Russian citizens. Moreover, the company representatives were from one company namely, Fortum's Finnish and Russian divisions. In addition, the samples analyzed are rather small. However, I was able to back up my findings by reference to the relevant literature, which verifies them.

Moreover, the broad scope of this study can be seen as its strength but also its weakness. Some findings were only touched upon

briefly and not discussed in as much detail as would have been desirable. On the other hand, I believe that this study, with its multiple discussed themes, serves as a great starting point for further research. Some of the suggested future research topics are discussed next.

The findings revealed the interesting business potential of the waste-to-energy industry, which is most certainly an interesting topic for future research. Furthermore, the findings revealed that business representatives viewed the RE business environment in Russia more positively than did other interviewees. This suggests that from the business perspective, the operating environment is favorable and thus, I believe that businesses would benefit from further and more thorough research on the Russian RE business environment. In order to acquire an enhanced understanding of company representatives' experiences, interviewees with various nationalities and from various companies should be involved in the study. This would widen the scope of interview insights as well as generate in research that is more generalizable. Furthermore, by interviewing also the political decision makers from the governmental and regional levels one could first increase the understanding of the political will to develop RE and second enhance the discussion about the conflict of interests between the central and regional levels. In addition, this study revealed several inconsistencies in Russian RE policies and political targets, among others, with respect to market liberalization. This topic would also benefit from further analysis. Lastly, the research process revealed that information on the Russian renewable energy industry is rather scarce and inconsistent and this should be more researched.

Overall, the development of alternative energy solutions in the energy-exporting countries should be explored in more detail in future since in order to reach the global sustainability goals, the engagement of the energy-exporting countries is crucial.

REFERENCES

Aalto, P., 2012. *Russia's energy policies: national, interregional and global levels*. Edward Elgar Publishing.

Aalto, P. (ed.), 2016. *The EU-Russian energy dialogue: Europe's future energy security*. Routledge.

Aalto, P., Dusseault, D., Kivinen M. and Kennedy M., D., 2012. How are Russian energy policies formulates? Linking the actors and structures of energy policy. In: Aalto, P., (eds) *Russia's energy policies national, interregional and global levels*. pp. 20-42. Edward Elgar Publishing Limited.

Aalto, P., Dusseault, D., Kennedy, M. D., and Kivinen, M., 2014. Russia's energy relations in Europe and the Far East: towards a social structurationist approach to energy policy formation. *Journal of International Relations and Development*, 17(1), pp.1-29.

Aalto, P., Nyyssönen, H., Kojo, M. and Pal, P., 2017. Russian nuclear energy diplomacy in Finland and Hungary. *Eurasian Geography and Economics*, 58(4), pp.386-417.

Abdurafikov, R., 2009. Russian electricity market: Current state and perspectives. *VVT Working Papers 121*. [online] Available at: < https://www.vtt.fi/inf/pdf/workingpapers/2009/W121.pdf> [Accessed in 12 November 2019].

Altheide, D., L. and Johnson, J., M., 1994. Criteria for assessing interpretive validity in qualitative research. In: N., K., Denzin and Lincoln Y., S. (Eds.), *Handbook of qualitative research*. pp.485-499. SAGE Publications Inc.

[АРВЕ] *Агентство по прогнозированию балансов в электроэнергетике*. [online] Available at: < http://www.e-apbe.ru/about/ > [Accessed 11 November 2019].

Atalay, Y., 2016. Adoption of renewable energy technologies in oil-rich countries: explaining policy variation in the Gulf Cooperation Council states. *Renewable Energy*, 85, pp.206-214.

Balmaceda, M., M., 2013. *The politics of energy dependency: Ukraine, Belarus and Lithuania between domestic oligarchs and Russian pressure.* University of Toronto press, Toronto.

Baxter, P. and Jack, S., 2008. Qualitative case study methodology: Study design and implementation for novice researchers. *The qualitative report*, 13(4), pp.544-559.

Bjørndal, M., and Jørnsten, K., 2001. Zonal pricing in a deregulated electricity market. *The Energy Journal*, 22(1), pp.51-73.

Bosman, R. and Loorbach, D., 2015. What is the ideal oil price for the energy transition? Energy Post (5th of January 2015). [online] Available at: <https://www.researchgate.net/profile/Rick_Bosman/publication/279993826_What_is_the_ideal_oil_price_for_the_energy_transition/links/55a218ca08ae1c0e046417f7/What-is-the-ideal-oil-price-for-the-energy-transition.pdf> [Accessed 7 July 2019].

Boute, A., 2011. A comparative analysis of the European and Russian support schemes for renewable energy: return on European experience for Russia. *Journal of World Energy Law & Business*, 4, pp.157–180.

Boute, A., 2012. Promoting renewable energy through capacity markets: an analysis of the Russian support scheme. *Energy Policy*, 46, pp. 68–77.

Boute, A., 2013. Renewable energy federalism in Russia: regions as new actors for the promotion of clean energy. *Journal of Environmental Law*, 25(2), pp.261-291.

Boute, A., 2016. Off-grid renewable energy in remote Arctic areas: an analysis of the Russian Far East. *Renewable and Sustainable Energy Reviews*, 59. pp.1029-1037.

Boute, A. and Willems, P., 2012. RUSTEC: Greening Europe's energy supply by developing Russia's renewable energy potential. *Energy Policy*, 51, pp.618-629.

Boute, A. and Zhikharev, A., 2019. Vested interests as driver of the clean energy transition: evidence from Russia's solar energy policy. *Energy Policy*, 133. Available at: <https://www-sciencedirect-com.libproxy.aalto.fi/science/article/pii/S0301421519304884?via%3Dihub#sec1> [Accessed 3 February 2019].

BP, 2019. *Country Insight – Russia.* [online] Available at: <https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy/country-and-regional-insights/russia.html> [Accessed 11 November 2019].

Bratanova, A., Robinson, J. and Wagner, L., 2016. New technology adoption for Russian energy generation: What does it cost? A case study for Moscow. *Applied energy*, 162, pp.924-939.

Braun, V. and Clarke, V., 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), pp.77-101.

Buckley, P., J. and Lessard, D., R., 2005. Regaining the edge for international business research. *Journal of International Business Studies*, 36(6), pp.595-599.

Burrell, G. and Morgan, G, 1979. *Sociological paradigms and organizational analysis*. Heinemann, London, UK.

Chang, P.-F. and Bruyninck, H., 2011. Wind energy in China: from ad hoc projects to strategic policy. *Renewable Energy Law and Policy*, 2(1), pp.17-28.

Chubais, A., 2019. *Возобновляемая энергетика в России: из прошлого в будущее.* [online] Available at: <https://www.rusnano.com/about/press-centre/first-person/20181002-rosnano-lektsiya-vozobnovlyaemaya-energetika-v-rossii-iz-proshlogo-v-budushchee> [Accessed 15 May 2019].

Cooke, D., 2013. *Russian Electricity Reform 2013 Update. International Energy Agency Insight Series, 2013*. International Energy Agency. [online] Available at: < https://www.osti.gov/etdeweb/servlets/purl/22112401> [Accessed 1 June 2019].

Darmani, A., Arvidsson, N., Hidalgo, A. and Albors, J., 2014. What drives the development of renewable energy technologies? Toward a typology for the systemic drivers. *Renewable and Sustainable Energy Reviews*, 38, pp.834-847.

Davison, N., 2019. The Anthropocene epoch: have we entered a new phase of planetary history. *The Guardian*. 30 May [online]. Available at: < http://pm22100.net/01_PDF_THEMES/97_ARTICLES_DIVERS/56_JUIN_2019/190604_Anthropocene_epoch_genesis.pdf> [Accessed 1 September 2019].

De Silva, C., L., Weins, N. and Potinkara, M., 2019. Formalizing the informal? A perspective on informal waste management in the BRICS through the lens of institutional economics. *Waste Management*, 99, pp.79-89.

del Río, P. and Cerdá, E., 2014. The policy implications of the different interpretations of the cost-effectiveness of renewable electricity support. *Energy Policy* 64, pp. 364–372.

DeWalt, K., M. and DeWalt, B., R., 2002. *Participant observation: a guide for fieldworkers*. Walnut Creek. CA: AltaMira Press.

Diapola, A., 2017. Saudis kick off $50 billion renewable energy plan to cut oil use. *Bloomberg.* [online] 20 Feb. Available at: <https://www.bloomberg.com/news/articles/2017-02-20/saudis-kick-off-50-billion-renewable-energy-plan-to-cut-oil-use> [Accessed 25 February 2017].

Dilley, R., 1999. *The problem of context.4th ed*. Berghahn Books.

Dusseault, D., 2010. Where has all the oil gone? Contradictions among Russia's socio-economic development, political legitimacy and corporate profits. In: *Comparative research on major regional powers in Eurasia -Paper 2*. Hokkaido Slavic-Eurasian Reserarch Center. pp.145-172.

Dyatel, T. and Dzakuto, V., 2018. Все против ветра. Зеленой генерации нет места на рынке. *Kommersant*. 9 Oct. [online] Available at: <https://www.kommersant.ru/doc/3764848> [Accessed 29 March 2019].

Dyatel, T., 2018. «Речь о приватизации ГЭС "РусГидро" не идет» Министр энергетики РФ Александр Новак о новых реформах. *Kommersant*. [online] 3 Oct. Available at: <https://www.kommersant.ru/doc/3759006> [Accessed 29 March 2019].

Easterby-Smith, M., Thorpe, R. and Jackson, P., R., 2012. *Management research*. Sage.

Edwards, J., 1993. Survey of Electronic Corpora and Related Resources for Language Researchers. In: Edwards, J. and Lampert M., (Eds) *Talking Data: Transcription and Coding in Discourse Research*. Lawrence Erlbaum Associates. pp.263–300.

Eisenhardt, K., M., 1989. Building theories from case study research. *Academy of Management Review* 14, pp.532–50.

Erdmann, G. and Engel, U., 2006. Neopatrimonialism revisited - beyond a catch-all concept. *IDEAS Working Paper Series from RePEc.*

Enel, 2019. *Enel in Russia awarded 71 MWh of new wind capacity in renewables tender*. [online] Available at: <https://www.enelgreenpower.com/media/press/d/2019/06/enel-in-russia-awarded-71-mw-of-new-wind-capacity-in-renewables-tender> [Accessed 4 July 2019].

Engoian, A., 2006. Industrial and institutional restructuring of the Russian electricity sector: status and issues. *Energy Policy,* 34, pp. 3233–3244.

Eriksson, P. and Kovalainen, A., 2008. *Qualitative methods in business research*. Los Angeles, California. London: SAGE.

Ermolenko, G., Proskuyakova L. and Ermolenko, B., 2017. Switching to renewables: what will Russia gain? *Foresight: the Journal of Futures Studies, Strategic Thinking and Policy*. 19(5), pp. 528-540.

European Commission, 2018. *Europe leads the global clean energy transition: commission welcomes ambitious agreement on further renewable energy development in the EU*. [online] Available at: <https://europa.eu/rapid/press-release_STATEMENT-18-4155_en.htm> [Accessed 7 August 2019].

European Social Survey, 2019. *European attitudes to climate change and energy: topline results from the round 8 of the European social survey*. [online] Available at: < https://www.europeansocialsurvey.org/docs/findings/ESS8_toplines_issue_9_climatechange.pdf> [Accessed 26 September 2019].

EY, 2018. *Обзор электроэнергетической отрасли России*. EY. [online] Available at: <https://www.ey.com/Publication/vwLUAssets/EY-

power-market-russia-2018/$File/EY-power-market-russia-2018.pdf> [Accessed 30 August 2019].

Fey, C. and Shekshnia, S., 2011. The key commandments for doing business in Russia. *Organizational Dynamics*, 40(1), p.57-66.

Fitz, J. and Halpin, D., 1995. Brief encounters: researching education policy-making in elite settings. In: J. Salisbury, and Delamont S. (Eds.), *Qualitative studies in education*. pp.65–86. Aldershot: Avebury.

Fortum, 2017. *Fortum-RUSNANO wind investment fund chooses Vestas as wind turbine supplier in Russia*. Fortum. [online] Available at: <https://www.fortum.com/media/2017/06/fortum-rusnano-wind-investment-fund-chooses-vestas-wind-turbine-supplier-russia> [Accessed 17 March 2019].

Fortum, 2018. *A growing presence in Russia's wind and solar power markets*. Fortum. [online] Available at: < https://www.fortum.com/media/2018/05/growing-presence-russias-wind-and-solar-power-markets> [Accessed 18 August 2019].

Fortum, 2019. *Operation started at Fortum-Rusnano wind investment fund's 50-MW wind farm in Ulyanovsk, Russia*. Fortum. [online] Available at: <https://www.fortum.com/media/2019/01/operation-started-fortum-rusnano-wind-investment-funds-50-mw-wind-farm-ulyanovsk-russia> [Accessed 17 August 2019].

Foster, A. and Robson, S., 1989. *Qualitative research in action*. Hodder & Stoughton.

Foy, H., 2019. Russian arctic Leader warns of "dramatic" climate change impact. *Financial Times*. [online] 6 Sept. Available at < https://www.ft.com/content/d855d522-cefc-11e9-99a4-b5ded7a7fe3f> [Accessed 13 September 2019].

Frankfurt School UNEP Collaborating Centre, Bloomberg New Energy Finance, 2015. *Global Trends in Renewable Energy Investment 2015*. Frankfurt School UNEP Collaborating Centre- [online] Available at: <https://wedocs.unep.org/bitstream/handle/20.500.11822/9403/-Global_trends_in_renewable_energy_investment_2015-201515028nefvisual8-mediumres.pdf.pdf?sequence=3&isAllowed=y> [Accessed 10 June 2019].

Gaddy, C., G. and Ickes, B., W., 2010. Russia after the global financial crisis. *Eurasian Geography and Economics*, 51(3), pp.281-311.

Gasnikova, A., A., 2013. The role of conventional and alternative energy in the regions of the North. *Economic and Social Changes: Facts, Trends, Forecast*, (5), pp. 68-78.

Gavrikova, E., Burda, Y., Gavrikov, V., Sharafutdinov, R., Volkova, I., Rubleva, M. and Polosukhina, D., 2019. Clean Energy Sources: Insights from Russia. *Resources*, 8(2), p.84-109.

Geertz, C., 1973. *The interpretation of cultures: selected essays*. New York: Basic Books.

Gel'man, V., 2016. The vicious circle of post-Soviet neopatrimonialism in Russia. *Post- Soviet Affairs*, 32(5), pp.455-473.

Gerring, J., 2004. What is a case study and what is it good for? *American Political Science Review*, 98(2), pp.341-354.

Gibson, W. and Brown, A., 2009. *Working with qualitative data*. Sage.

Godzimirski, J., M., 2013. *Russian energy in a changing world*. Ashgate, Burlington.

Gore, O., Viljainen, S., Makkonen, M., and Kuleshov, D., 2012. Russian electricity market reform: deregulation or re-regulation? *Energy Policy*, 41, pp.676-685.

Government of the Russian Federation, 2010a. *Decree No.238 on the determination of price parameters for the trade in capacity*.

Government of the Russian Federation, 2010b. *Decree No.1172 Approving the Wholesale Market Rules.*

Government of the Russian Federation, 2013. *Government resolution no. 861-R of 28 May 2013, "On Amendments to Guidelines for State Policies in Increasing the Effectiveness of Use of Renewable Energy Sources for the Period until 2020"*.

Government of the Russian Federation, 2015a. *No.47, Постановление Правительства РФ от 27.09.2018 N 1145 "О внесении изменений в некоторые акты Правительства Российской Федерации по вопросам стимулирования использования возобновляемых источников энергии"*.

Government of the Russian Federation, 2015b. *О создании правительственной комиссии по импорто замещению и ее составе.* Russian Government. [online] Available at: <http://government.ru/docs/19160/> [Accessed 23 July 2019].

Government of the Russian Federation, 2015c. *No. 2279-r, 10 November 2015, On amendments to the main directions of the government policies in the sphere of energy efficiency of the power sector through RES use up to 2024*.

Government of the Russian Federation, 2016. *Draft Energy Strategy of the Russian Federation until 2035*. [online] Available at: < https://policy.asiapacificenergy.org/node/1240> [Accessed 1 February 2019].

Government of the Russian Federation, 2019. *Russia's Energy Security Doctrine*. [online] Available at: <http://static.kremlin.ru/media/events/files/ru/rsskwUHzl25X6IijBy20Doj88faOQLN4.pdf > [Accessed 14 May 2019].

Guba, E., G. and Lincoln, Y., S., 1994. Competing paradigms in qualitative research. *Handbook of Qualitative Research*, 2, pp.163-194.

Gubrium, J., F. and Holstein, J., A., 2001. *Handbook of interview research: context and method.* Sage Publications.

Halsnæs, K. and Garg, A., 2011. Assessing the role of energy in development and climate policies—conceptual approach and key indicators. *World Development*, 39(6), pp.987-1001.

Hammersley, M., 1996. The relationship between qualitative and quantitative research: paradigm loyalty versus methodological eclecticism. In: J., T., E., Richardson (Ed.), *Handbook of research methods for psychology and the social sciences.* pp.159-174. Leicester, UK: BPS Books.

Handayani, K., Krozer, Y. and Filatova, T., 2019. From fossil fuels to renewables: An analysis of long-term scenarios considering technological learning. *Energy policy*, 127, pp.134-146.

Hanson, P. and Teague, E., 2005. Big business and the state in Russia. *Europe-Asia Studies*, 57(5), pp.657-680.

Hartikainen, J., 2019. Fortumiin suhtauduttiin kuin hunniarmeijaan kaupungin porteilla – Illallinen Putinin kanssa avasi jättikaupan umpisolmun. *Helsingin Sanomat.* 9 Oct. [online] Available at: <https://www.hs.fi/paivanlehti/09102019/art-2000006266390.html> [Accessed 10 October 2019].

Henry, L. and Sundstrom, L., 2012. Russia's climate policy: international bargaining and domestic modernisation. *Europe-Asia Studies*, 64(7), pp.1297–1322.

Hornby, A., S., Cowie, A., P. and Gimson, A., C., 1983. *Oxford advanced learner's dictionary*. Oxford: Oxford University Press.

Hurmerinta-Peltomäki, L. and Nummela, N., 2006. Mixed methods in international business research: a value-added perspective. *Management International Review*, 46(4), pp.439-459.

[IEA] International Energy Agency, 2016. *World energy outlook, Paris*. International Energy Agency [online]. Available at: <https://www.iea.org/newsroom/news/2016/november/world-energy-outlook-2016.html> [Accessed 27 July 2019].

[IEA] International Energy Agency, 2018. *Outlook for producer economies. What do changing energy dynamics mean for major oil and gas exporters?* [pdf] International Energy Agency.

[IEA] International Energy Agency, 2019. *IEA/IRENA Joint policies and measures database*. International Energy Agency [online]. Available at:< https://www.iea.org/policiesandmeasures/pams/russia/name-44254-en.php?s=dHlwZT1yZSZzdGF0dXM9T2s,&return=PG5hdiBpZD0iYnJlYWRjcnVtYiI-PGEgaHJlZj0iLyI-SG9tZTwvYT4gJnJhcXVvOyA8YSBocmVmPSIvcG9saWNpZXNhbmRtZWFzdXJlcy8iPlBvbGljaWVzIGFuZCBNZWFzdXJlczwvYT4gJnJhcXVvOyA8YSBocmVmPSIvcG9saWNpZXNhbmRtZWFzdXJlcy9yZW5ld2FibGVlbmVyZ3kvIj5SZW5ld2FibGUgRW5lcmd5PC9hPjwvbmF2Pg > [Accessed 19 October 2019].

[IFC] International Finance Corporation, 2011. *Renewable energy policy in Russia: waking the green giant*. International Finance Corporation. [online] Available at: <https://www.ifc.org/wps/wcm/connect/bf9fff0049718eba8bcaaf849537832d/PublicationRussiaRREP-CreenGiant-2011-11.pdf?MOD=AJPERES> [Accessed 25 July 2019].

[IFC] International Finance Corporation, 2013. *Russia's new capacity-based renewable energy support scheme. An analysis of Decree No. 449.* International Finance Corporation. [online] Available at: <https://www.ifc.org/wps/wcm/connect/f818b00042a762138b17af0dc33b630b/Energy-Suppor-Scheme-Eng.pdf?MOD=AJPERES> [Accessed 25 July 2019].

[IEA] International Energy Agency, 2019. *Perspectives for the Clean Energy Transition. The Critical Role of Buildings.* International Energy Agency. [online] Available at: <https://webstore.iea.org/perspectives-for-the-clean-energy-transition> [Accessed 7 August, 2019].

[IHA] International Hydropower Association, 2017. *Russia, statistic*. [online] Available at: <https://www.hydropower.org/country-profiles/russia> [Accessed 17 August 2019].

[IMF] International Monetary Fund, 2013. *Boom, bust, or prosperity? Managing Sub-Saharan Africa's natural resource wealth*. International Monetary Fund. [online] Available at: <https://www.imf.org/external/pubs/ft/dp/2013/dp1302.pdf> [Accessed 13 November 2019].

Interrao, 2019. *Electricity trading in Russia.* [online] Available at: < https://www.interrao.ru/en/activity/traiding/tradesb.php> [Accessed 15 March 2019].

[IPCC] Intergovernmental Panel on Climate Change, 1996. *Revised 1996 IPCC Guidelines for national greenhouse gas inventories*. OECD. IPCC/OECD/IEA. UK Meteorological Office, Bracknell.

[IPCC] International Panel on Climate Change, 2014. *Climate change 2014: mitigation of climate change*. Working group III contribution to the fifth assessment report of the Intergovernmental Panel on Climate Change. Cambridge University Press. [online] Available at:

<https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_frontmatter.pdf> [Accessed 26 June 2019].

[IPCC] International Panel on Climate Change, 2018. *Global warming of 1.5°C.* International Panel on Climate Change. [online] Available at: <https://www.ipcc.ch/sr15/> [Accessed 1 March 2019].

[IRENA] International Renewable Energy Agency, 2016. *The power to change: solar and wind cost reduction potential to 2025*. International Renewable Energy Agency. [online] Available at: <https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2016/IRENA_Power_to_Change_2016.pdf> [Accessed 26 June 2019].

[IRENA] International Renewable Energy Agency, 2017. *REMAP 2030 Renewable energy prospects for the Russian Federation.* International Renewable Energy Agency. [online] Available from: <https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2017/Apr/IRENA_REmap_Russia_paper_2017.pdf#page=85>. [Accessed 18 January 2019].

[IRENA] International Renewable Energy Agency, 2019. *Falling renewable power costs open door to greater climate ambition*. International Renewable Energy Agency. [online] Available at: <https://www.irena.org/newsroom/pressreleases/2019/May/Falling-Renewable-Power-Costs-Open-Door-to-Greater-Climate-Ambition> [Accessed 30 July 2019].

James, N., 2015. Using email interviews in qualitative educational research: creating space to think and time to talk. *International Journal of Qualitative Studies in Education*, 29(2), pp.150-163.

Kennedy, D., 2003. Liberalisation of the Russian power sector. *Energy Policy,* 31, pp.745–758.

Khrushcheva, O. and Maltby, T., 2016. The future of EU-Russia energy relations in the context of decarbonisation. *Geopolitics*, 21(4), pp.799-830.

Khokhlov, A., Melnikov, Y., Veselov, F., Kholkin, D. and Datsko, K., 2018. *Distributed energy resources in Russia: development potential*. Moscow School of Management Skolkovo. [online] Available at: <https://energy.skolkovo.ru/downloads/documents/SEneC/Research/SKOLKOVO_EneC_DER_2018.10.09_Eng.pdf> [Accessed 25th April].

Kivinen, M., 2012. Public and business actors in Russia's energy policy. In: Aalto, P., (ed) *Russia's energy policies national, interregional and global levels*. pp.45-62. Edward Elgar Publishing Limited.

Kitzing, L., Mitchell, C. and Morthorst, P., E., 2012. Renewable energy policies in Europe: converging or diverging? *Energy Policy* 51, pp.192–201.

Klochikhin, E., A., 2012. Russia's innovation policy: Stubborn path-dependencies and new approaches. *Research Policy*, 41(9), pp.1620-1630.

Kolb, B., 2008. *Marketing research for non-profit, community and creative organizations*. Amsterdam: Elsevier Butterworth-Heinemann.

Korobova, N., Larionov, A., Michelsen, J., D., Pulyayev, M., Ivanovskyy, S., Turilova, K. and Kuznetsova, M., 2019. *Waste in Russia: garbage or valuable resource?* Washington, D.C. World Bank Group. [online] Available at: <http://documents.worldbank.org/curated/en/702251549554831489/Waste-in-Russia-Garbage-or-Valuable-Resource > [Accessed 6 September 2019].

Korppoo, A. and Korobova, N., 2012. Modernizing residential heating in Russia: End-use practices, legal developments, and future prospects. *Energy Policy*, 42, pp.213-220.

Korppoo, A. and Kokorin, A., 2017. Russia's 2020 GHG emissions target: Emission trends and implementation. *Climate Policy*, 17(2), pp.113-130.

Kovalenko, K., and Kovalenko, N., 2018. The problem of waste in the Russian Federation. *MATEC Web of Conferences*, 193. [online] Available at: < https://www.matec-conferences.org/articles/matecconf/pdf/2018/52/matecconf_esci2018_02030.pdf > [Accessed 6 May 2019].

Kozlova, M., Collan M. and Luukka, P., 2015. Renewable energy in emerging economies: Shortly analyzing the Russian incentive mechanisms for renewable energy investments. *Proceedings of the International Research Conference, GSOM Emerging Markets Conference: Business and Government Perspectives*. [online] Available at: < https://www.researchgate.net/profile/Mariia_Kozlova/publication/284859004_Renewable_Energy_in_Emerging_Economies_Shortly_Analyzing_the_Russian_Incentive_Mechanisms_for_Renewable_Energy_Investments/links/56597c1a08aefe619b22b979/Renewable-Energy-in-Emerging-Economies-Shortly-Analyzing-the-Russian-Incentive-Mechanisms-for-Renewable-Energy-Investments.pdf> [Accessed 12 June 2019].

Kozlova, M. and Collan, M., 2016. Modeling the effects of the new Russian capacity mechanism on renewable energy investments. *Energy Policy*, 95, pp.350-360.

Kozlova, M., 2017. Real option valuation in renewable energy literature: Research focus, trends and design. *Renewable and Sustainable Energy Reviews*, 80, pp.180-196.

Kuleshov, D., Viljainen, S., Annala, S. and Gore, O., 2012. Russian electricity sector reform: Challenges to retail competition. *Utilities Policy*, 23, pp.40-49.

Kvale, S. and Brinkmann, S., 2009. *Interviews: learning the craft of qualitative research interviewing*. Sage.

Lanshina, T., A. and Kulakov, A., V., 2017. Development of renewable energy in China: studying the experience and making recommendations for Russia. *Thermal Engineering*, 64(7), pp.526-533.

Lanshina, T., A., John, A., Potashnikov, V., Y. and Barinova, V., A., 2018. The slow expansion of renewable energy in Russia: Competitiveness and regulation issues. *Energy Policy*, 120, pp. 600-609.

Ledeneva, A., 2009. From Russia with blat: can informal networks help modernize Russia? *Social Research: An International Quarterly*, 76(1), pp.257-288.

Levitsky, S. and Way, L., A., 2010. *Competitive authoritarianism: hybrid regimes after the Cold War.* Cambridge university press, New York.

Lombardi, P., Sokolnikova, T., Suslov, K., Voropai, N. and Styczynski, Z.A., 2016. Isolated power system in Russia: a chance for renewable energies? *Renewable Energy*, 90, pp.532-541.

Loorbach, D. and Verbong, G., 2012. Conclusion: is governance of the energy transition a reality, an illusion or a necessity? In: *Governing the energy transition*. pp.328-346. Routledge.

Luderer, G., Pietzcker, R., C., Carrara, S., de Boer, H., S., Fujimori, S., Johnson, N. and Arent, D., 2017. Assessment of wind and solar power in global low-carbon energy scenarios: an introduction. *Energy Economics*, 64, pp. 542-551.

Lukoil, 2019. *Renewable energy*. [online] Available at: < http://www.lukoil.com/Responsibility/SafetyAndEnvironment/Ecology/RenewableEnergy > [Accessed 30 August 2019].

Lund, H., 2010. The implementation of renewable energy systems. Lessons learned from the Danish case. *Energy,* 35, pp. 4003–4009.

Magun, V. and Rudnev, M., 2010. The life values of the Russian population. Similarities and differences in comparison with other European countries. *Sociological Research*, 49(4), pp.3-57.

Malle, S., 2013. Economic modernisation and diversification in Russia. Constraints and challenges. *Journal of Eurasian Studies*, 4(1), pp.78-99.

Marschan-Piekkari, R. and Welch, C., 2004. *Handbook of qualitative research methods for international business*. Cheltenham UK, Northampton, MA, USA: Edward Elgar Publishing.

Martus, E., 2019. Russian industry responses to climate change: the case of the metals and mining sector. *Climate Policy*, 19(1), pp.17-29.

Maxwell, J., A., 2008. Designing a qualitative study. *The SAGE handbook of applied social research methods*.

McNally, R. 2017. *Crude volatility: the history and future of boom-bust oil prices.* New York: Columbia University Press.

Medvedev, D., 2009. *Go, Russia!* [online] Available at: <http://en.kremlin.ru/events/president/news/5413> [Accessed 16 June 2019].

Michailova, S., 2011. Contextualizing in international business research: why do we need more of it and how can we be better at it? *Scandinavian Journal of Management,* 27(1), pp.129-139.

Miles, M., B. and Huberman, A., M., 1994. *Qualitative data analysis: an expanded source book.* Thousand Oaks, CA: Sage.

Ministry of Energy of the Russian Federation, 2012. *Функционирование и Развитие Электроэнергетики Российской Федерации в 2011*. Ministry of Energy of the Russian Federation. [online] Available at: <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=2ahUKEwiIsrfagpfkAhUxmYsKHR4NB3EQFjAAegQIAxAC&url=https%3A%2F%2Fminenergo.gov.ru%2Fsystem%2Fdownload-pdf%2F3399%2F3196&usg=AOvVaw16LKeq9o6AZ0czU8mzVUKu> [Accessed 1 August 2019].

Ministry of Energy of Russian Federation, 2015. *Русгидро продолжает финансирование проекта строительства ТЭЦ в Советской Гавани*. [online] Available at: < https://minenergo.gov.ru/node/2304> [Accessed 19 July 2019].

Mondal, Md., A., Hawila, H., Kennedy, D., Mezher, A., 2016. The GCC countries RE-readiness: strengths and gaps for development of renewable energy technologies. *Renewable and Sustainable Energy Reviews*, Vol. 54, pp.1114-1128.

Moreno, B., López, A., J., and García-Álvarez, M., T., 2012. The electricity prices in the European Union. The role of renewable energies and regulatory electric market reforms. *Energy,* 48(1), pp.307-313.

Nachmias, C., Nachmias, D., 1992. *Research methods in the social sciences*. 4th edition. New York: St. Martin's Press.

Niemeläinen J., 2019. Venäjän-kaupan uusi kärkikaksikko Ilkka Salonen ja Lauri Veijalainen: Venäjä on edelleen lupaava markkina. *Helsingin sanomat*. [online] 21 Oct. Available at: < https://www.hs.fi/talous/art-2000006279827.html> [Accessed 21 October 2019].

NP Market Council, 2019. *General Information*. [online] Available at: <http://www.en.np-

sr.ru/en/srnen/abouttheelectricityindustry/generalinformation/index.htm> [Accessed 1 February 2019].

Ostrander, S., A., 1993. “Surely you're not in this just to be helpful” access, rapport, and interviews in three studies of elites. *Journal of Contemporary Ethnography*, 22(1), pp.7-27.

Palamarchuk, S., I., Lamoureux, M., A. and Voropai, N., I., 2008. Status of Russian power sector liberalization. In: *2008 Third international conference on electric utility deregulation and restructuring and power technologies*, IEEE. pp.82-88.

Patton, M. Q., 2002. Two decades of developments in qualitative inquiry: A personal, experiential perspective. *Qualitative social work*, 1(3), pp.261-283.

Petrov, N., Lipman, M. and Hale, H., E., 2014. Three dilemmas of hybrid regime governance: Russia from Putin to Putin. *Post-Soviet Affairs*, 30, pp.1–26.

Piekkari, R., Welch, C. and Paavilainen, E., 2008. The case study as disciplinary convention: evidence from international business journals. *Organizational Research Methods*, 12(3), pp.567-589.

Pittman, R., 2007. Restructuring the Russian electricity sector: re-creating California? *Energy Policy,* 35, pp.1872-1883.

Poberezhskaya, M., 2015. *Communicating climate change in Russia: state and propaganda.* Routledge.

Polyansky, A., 2019. Алишер Каланов: Пять гигаватт возобновляемой энергетики — только начало. *Сноб*. [online] 26 June. Available at: < https://snob.ru/entry/179025/> [Accessed 1 November, 2019].

Poudineh, R., Sen, A. and Fattouh, B., 2018. Advancing renewable energy in resource-rich economies of the MENA. *Renewable Energy*, 123, pp.135-149.

Pristupa, A., O. and Mol, A., P., 2015. Renewable energy in Russia: The take off in solid bioenergy? *Renewable and Sustainable Energy Reviews*, *50*, pp.315-324.

Proskuryakova, L., N. and Ermolenko, G., V., 2019. The future of Russia's renewable energy sector: trends, scenarios and policies. *Renewable Energy*, 143, pp. 1670–1686.

Putin, V., 2019a. *Presidential Address to the Federal Assembly*. [online] 1 March. Available at: <http://en.kremlin.ru/events/president/transcripts/messages/56957> [Accessed in 13 November 2019].

Putin, V., 2019b. *Vladimir Putin addressed the II Global Manufacturing and Industrialisation Summit* (GMIS 2019). The Global Manufacturing and Industrialisation Summit 2019. [online] 9, July. Available at: < http://en.kremlin.ru/events/president/news/60961> [Accessed in 10 July 2019].

Ram, M., Bogdanov, D., Aghahosseini, A., Oyewo, S., Gulagi, A., Child, M., and Breyer, C., 2017. *Global Energy System Based on 100% Renewable Energy—Power Sector*. Lappeenranta University of Technology and Energy Watch Group: Lappeenranta, Finland. [online] Available at: http://www.neocarbonenergy.fi/wp-content/uploads/2016/02/14_Ram.pdf [Accessed 26 June 2019].

Ram, M., Child, M., Aghahosseini, A., Bogdanov, D., Lohrmann, A., and Breyer, C., 2018. A comparative analysis of electricity generation costs from renewable, fossil fuel and nuclear sources in G20 countries for the period 2015-2030. *Journal of Cleaner Production*, 199, pp.687-704.

[REN21] the Renewable Energy Policy Network for the 21st Century, 2014. *Ten years of renewable energy progress*. The Renewable Energy Policy Network for the 21st Century. [online] Available at: <http://www.ren21.net/Portals/0/documents/activities/Topical%20Reports/REN21_10yr.pdf> [Accessed 17 August, 2019].

[REN21] the Renewable Energy Policy Network for the 21st Century, 2015. Renewables 2015 Global Status Report. The Renewable Energy Policy Network for the 21st Century. [online] Available at: <http://www.ren21.net/wp-content/uploads/2015/07/REN12-GSR2015_Onlinebook_low1.pdf> [Accessed 29 April 2019].

[REN21] the Renewable Energy Policy Network for the 21st Century, 2019. *Renewables 2019. Global status report*. The Renewable Energy Policy Network for the 21st Century [online]. Available at: <https://www.ren21.net/wp-content/uploads/2019/05/gsr_2019_full_report_en.pdf> [Accessed 17 August 2019].

Russian Constitutional Court, 2011. *Постановление Конституционного Суда РФ но. 2-П.*

Russian Federation Council, 2018. *Вопросы северного завоза необходимо решать комплексно. -А. Акимов*. [online] Available at: <http://council.gov.ru/events/news/99892/> [Accessed 15 August 2019].

Saldana, J., 2011. *Fundamentals of qualitative research*. OUP USA.

Salonen, H., 2018. Public justification analysis of Russian renewable energy strategies. *Polar Geography*, 41(2), pp. 75-86.

Sanderson, H., 2019. Clean energy shares streak ahead of fossil fuel stock. *Financial Times*. [online] 2 October. Available at: < https://www.ft.com/content/2586fa10-e122-11e9-b112-9624ec9edc59 > [Accessed 3 October 2019].

Sayer, A., 1992. *Method in Social Science*. 2nd edition. Routledge, London.

Schmidt-Felzmann, A., 2016. It's never "just business". *Global Affairs*, 2(2), pp. 115-118.

Scholten, D., 2018. *The geopolitics of renewables*. New York, NY: Springer.

Seddon, M., 2019. Russia's rubbish mountain piles pressure on Putin. *Financial Times*. [online] Available at: <https://www.ft.com/content/b4553564-a9fe-11e9-984c-fac8325aaa04> [Accessed 15 October 2019].

Severstal, 2018. *Severstal, RUSNANO and Windar Renovables to manufacture wind turbine towers in Russia.* [online] Available at: <https://www.severstal.com/eng/media/news/document23160.phtml> [Accessed 30 August 2019].

Shank, G. D., 2002. *Qualitative research: A personal skills approach*. Upper Saddle River, NJ: Prentice Hall.

Sharmina, M., Anderson, K. and Bows-Larkin, A., 2013. Climate change regional review: Russia. *Wiley Interdisciplinary Reviews: Climate Change*, 4(5), pp.373-396.

Sharmina, M., 2017. Low-carbon scenarios for Russia's energy system: a participative backcasting approach. *Energy Policy*, 104, pp.303-315.

Shepovalova, O., V., 2015. Energy saving, implementation of solar energy and other renewable energy sources for energy supply in rural areas of Russia. *Energy Procedia*, 74, pp.1551-1560.

Sidorovich, V., 2015. *Мировая энергетическая революция*. Alpina Publisher, Russia.

Siemens Gamesa, 2018. *Siemens Gamesa signs second order with Enel in Russia for over 200 MW*. [online] Available from: <https://www.siemensgamesa.com/en-

int/newsroom/2018/12/contract-onshore-russia-enel-3-x-platform> [Accessed 18 August 2019].

Silverman, D., 2001. *Interpreting Qualitative Data: Methods for Analysing Talk, Text and Interaction*. Sage Publication.

Simons, H., 2014. Case study research: In-depth understanding in context. In: P. Leavy, (ed.), *The Oxford Handbook of Qualitative Research*, 1st edition. pp.477-470. Oxford University Press.

Skryzhevska, Y., Tynkkynen, V.-P., Leppänen, S., 2015. Russia's climate policies and local reality. *Polar Geography*, 38, pp. 146–170.

Smeets, N., 2014. *Combating or cultivating climate change? Russia's approach to renewable energy as an opportunity for the EU as a facilitating actor*. In Netherlands Institute of Government (NIG) Annual Work Conference, Date: 2014/11/27-2014/11/28, Location: Delft.

Smeets, N., 2017. Similar goals, divergent motives. The enabling and constraining factors of Russia's capacity-based renewable energy support scheme. *Energy Policy*, 101, pp.138-149.

Smeets, N., 2018. The green menace: unraveling Russia’s elite discourse on enabling and constraining factors of renewable energy policies. *Energy Research and Social Science*, 40, pp.244-256.

Solar Systems, 2019. *About company*. [online] Available at: <http://en.solarsystems.msk.ru/about-company/#solar-systems> [Accessed 19 August 2019].

Solanko, L., 2011. How to liberalize a thousand TWh market? - Restructuring the Russian power sector. *BOFIT,* 2011(1), pp.3-20.

Sovacool, B., K., 2016. The history and politics of energy transitions: comparing contested views and finding common ground. *WIDER Working Paper*, 2016/81. United Nations University [online]. Available at: <

https://www.econstor.eu/bitstream/10419/146275/1/861502779.pdf> [Accessed 12 March].

Stake, R., E., 1995. *The art of case study research*. Sage Publications. London

Steffen, W., Grinevald, J., Crutzen, P. and McNeill, J., 2011. The Anthropocene: conceptual and historical perspectives. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences,* 369, pp.842-867.

Stoecker, R., 1991. Evaluating and rethinking the case study. *The Sociological Review*, 39(1), pp.88-112.

Surzhikova, O., A., 2012. Проблемы и основные направления развития электроснабжения удаленных и малонаселенных потребителей России. *Вестник Науки Сибири*, 4, pp.103-108.

Van der Vijver, F., J., Leung, K. and Leung, K., 1997. *Methods and data analysis for cross-cultural research*. Sage.

Vasileva, E., Viljainen, S., Sulamaa, P. and Kuleshov, D., 2015. RES support in Russia: impact on capacity and electricity market prices. *Renewable Energy*, 76, pp.82-90.

Vavina, E., 2019. «Совет рынка» хочет внедрить сертификаты на зеленую энергетику. *Vedomosti.* [online] 21 March. Available at: <https://www.google.com/amp/s/www.vedomosti.ru/amp/857bcf1a0e/business/articles/2019/03/21/797032-sertifikati-na-zelenuyu-energetiku > [Accessed 1 October 2019].

Veselov, F. and Sulamaa, P., 2014. *Russian electricity market – a review*. [online] Available at: <https://www.energiauutiset.fi/media/energiauutiset/markkinat/2014/venajansahkomarkkinatengl.pdf> [Accessed 15 June 2019].

Viljainen, S., Makkonen, M., Gore, O. and Kuleshov, D., 2013. *Day-ahead electricity market in Russia*. [online] Available at:

<https://www.fingrid.fi/globalassets/dokumentit/fi/sahkomarkkinat/rajakapasiteetit-ja--siirrot/electricity-market-in-russia.pdf> [Accessed 1 June 2019].

Voldnes, G., Grønhaug, K. and Sogn-Grundvåg, G., 2014. Conducting qualitative research in Russia: Challenges and advice. *Journal of East-West Business*, 20(3), pp.141-161.

Tung, R., L., and Witteloostuijn, A., 2008. What makes a study sufficiently international? *Journal of International Business Studies*, 39(2), pp.180 –183.

Tynkkynen, N. and Aalto, P., 2012. Environmental sustainability of Russia's energy policies. *Russia's Energy Policies: National, Interregional and Global Levels*. Cheltenham: Edvard Elgar.

Tynkkynen, N., 2014. Prospects for ecological modernization in Russia: analysis of the policy environment. Demokratizatsiya, 22(4), p.575.

Tynkkynen V-P., Pynnöniemi K. and Höysniemi S., 2017. *Global energy transitions and Russia's energy influence in Finland.* Government's analysis, assessment and research activities [online]. Available at: <https://tietokayttoon.fi/documents/1927382/2116852/19_Global+energy+transitions+and+Russias+energy+influence+in+Finland.pdf/67f16b9c-daa7-445b-9ad6-76a6c1b30a99/19_Global+energy+transitions+and+Russias+energy+influence+in+Finland.pdf.pdf?version=1.0> [Accessed 19 June 2019].

Tynkkynen, V.-P., and Koch, N., 2019. The Geopolitics of Renewables in Kazakhstan and Russia. *Geopolitics*, 2019, pp.1-20.

Tynkkynen, V.-P., and Tynkkynen, N., 2018. Climate denial revisited: (Re) contextualising Russian public discourse on climate change during Putin 2.0. *Europe-Asia Studies*, 70(7), pp.1103-1120.

Tynkkynen, V-P., 2013. Russian bioenergy and the EU's renewable energy goals: perspectives of security. In: Oxenstierna, S. and Tynkkynen, V.-P. (Eds.), *Russian energy and security up to 2030*. pp.95–113. Routledge, London.

Tynkkynen, V-P., 2019. Rohkeuden puute ajaa öljyvaltio Venäjän rakentamaan hiilivetykulttuuria. *Kaikenlaista Rohkeutta*, pp.201-213. Gaudeamus.

[UNFCCC] United Nations Framework Convention on Climate Change, 2019. *Paris Agreement.* [online] Available at: < https://unfccc.int/resource/bigpicture/#content-the-paris-agreemen> [Accessed 22 August 2019].

[UN Treaty Collection] United Nations Treaty Collection, 2019. *Paris Agreement*. [online] Available at: <https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&lang=_en&clang=_en#EndDec> [Accessed 26 October 2019].

Van der Meulen, F., E., 2009. Gas supply and EU–Russia relations. *Europe-Asia Studies*, 61(5), pp.833–56.

Welch, C., Marschan-Piekkari, R., Penttinen, H., and Tahvanainen, M., 2002. Corporate elites as informants in qualitative international business research. *International Business Review*, 11(5), pp.611-628.

White, W., Lunnan, A., Nybakk, E. and Kulisic, B., 2013. The role of governments in renewable energy: The importance of policy consistency. *Biomass and bioenergy*, 57, pp.97-105.

Whittemore, R., Chase, S., K. and Mandle, C., L., 2001. Validity in qualitative research. *Qualitative health research*, 11(4), pp.522-537.

Wittmann, N., 2013. OPEC: how to transition from black to green gold. *Energy Policy*, 62, pp.959–965.

World Energy Council, 2014. *Global Energy Transitions a comparative analysis of key countries and implications for the international energy debate*. World Energy Council [online]. Available at: <https://www.worldenergy.org/wp-content/uploads/2014/12/Global-Energy-Transitions-2014_EfG2014-mit-AT-Kearney.pdf> [Accessed 10 July 2019].

World Energy Council, 2016. *Solar in Russia*. World Energy Council [online]. Available at: <https://www.worldenergy.org/data/resources/country/russia/solar/> [Accessed 17 August 2019].

Yin, R., K., 2003. *Case study research design and methods*. Thousand Oaks, CA: Sage.

Yin, R., K., 2009. *Case study research*. Los Angeles, Calif.: Sage Publications.

Zeng, S., Liu, Y., Liu, C. and Nan, X., 2017. A review of renewable energy investment in the BRICS countries: history, models, problems and solutions. *Renewable and Sustainable Energy Reviews*, 74, pp.860-872.

Øverland, I., and Kjærnet, H., 2016. *Russian renewable energy: the potential for international cooperation*. Routledge.

Øverland, I., 2010. The Siberian curse: a blessing in disguise for renewable energy? *Sibirica*, 9(2), pp.1-20.

Wüstenhagen, R. and Menichetti, E., 2012. Strategic choices for renewable energy investment: conceptual framework and opportunities for further research. *Energy Policy*, 40, pp.1-10.

APPENDICES

Appndix 1. The table of interviewees

	INTERVIEWEE	NATIONALITY	OCCUPATION	ORGANIZATION	STRUCTURAL DIMENSION	REFERRED IN A TEXT AS	INTERVIEW METHOD
1.	Aleksander Borovikov	Russian	Head of Strategic Projects	Fortum	Resource-geographic	DB	Vis-a-vis
2.	Yana Sufyarova	Russian	Analyst	Fortum	Resource-geographic	YA	Vis-a-vis
3.	Anatoly Trukhin	Russian	Head of market analysis	Fortum	Resource-geographic	AT	Vis-a-vis
4.	Alexey Kokorin	Russian	Head of Climate and Energy Program	WWF	Ecologic	ALK	Phone
5.	Alexey Retejum	Russian	Researcher, deputy of the Moscow city			AR	Phone
6.	Evgenia Vanadzina	Russian	Postdoctoral researcher	Lappeenranta University of Technology	Resource-geographic	EV	Phone
7.	Liliana Proskuryakova	Russian	Director	Institute for Statistical Studies and Economics of Knowledge		LP	E-mail
8.	--	Russian	Direcotr	Russian energy company	Resource-geographic	Interviewee 8	E-mail
9.	--	Russian		NP Market Council	Institutional	NP Market Council	Vis-a-vis
10.	Katariina Tanhua-Tyrkkö	Finnish	Desk Officer, Economic and Trade Policy	Finnish Ministry of Foreign Affairs	Institutional/resource-geographic	KTT	Skype
11.	Simon-Erik Ollus	Finnish	Vice-President, Trading and Asset Optimization	Fortum	Resource-geographic	SEO	Vis-a-vis
12.	Pami Aalto	Finnish	Jean Monnet Professor, energy policy	University of Tampere	Institutional/resource geographic	PA	Phone
13.	--	Finnish	Energy consultant	--	Resource-geographic		Vis-a-vis
14.	Laura Solanko	Finnish	Senior Adviser	BOFIT (The Bank of Finland Institute for Economies in Transition)	Economic/institutional	LS	Vis-a-vis

15.	Anna Korppoo	Finnish	Senior Research Fellow, Russian climate policy	FNI (Fridtjof Nansen Institute)	Ecologic/institutional	AK	Phone

Appndix 2. The list of interview questions

THEMES	MAIN QUESTIONS	FOLOOW-UP QUESTIONS
RESOURCE GEOGPHIC	1. What is the level of the renewable energy development in Russia? 2. How would you describe the technological context of the renewable energy in Russia? 3. What is your view on the business opportunities of Russian renewable energy industry?	
INSTITUTIONAL	4. What is the political will to develop the renewable energy industry in Russia? 5. How would you evaluate the regulatory framework of the renewable energy in Russia? 6. How do you see the future development of the Russian renewable energy industry?	4.1. Is it favorable for the investors? 6.1. According to you, has there been any changes?
FINANCIAL	7. From the point of view of investor, how would you evaluate the Russian renewable energy market?	
ECOLOGICAL	7.1. How is the renewable energy viewed in the Russian society?	7.2. How is the renewable energy discussed in the media?